A dissertation on

AN OBSERVATIONAL STUDY TO COMPARE THE OUTCOME OF CONJUNCTIVAL AUTOGRAFT AFTER EXTENDED EXCISION OF PTERYGIUM ALONG WITH AND WITHOUT CYCLOSPORINE FOR PRIMARY FLESHY PTERYGIUM

Submitted to the

THE TAMILNADU Dr.M.G.R MEDICAL UNIVERSITY

In partial fulfillment of the regulations for the award of the degree of

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MADURAI MEDICAL COLLEGE

MADURAI

THE TAMILNADU Dr. M.G.R MEDICAL UNIVERSITY

CHENNAI, TAMILNADU

MAY 2018

CERTIFICATE

This is to certify that the dissertation titled"AN OBSERVATIONAL STUDY TO COMPARE THE OUTCOME OF CONJUNCTIVAL AUTOGRAFT AFTER EXTENDED EXCISION OF PTERYGIUM ALONG WITH AND WITHOUT CYCLOSPORINE FOR PRIMARY FLESHY PTERYGIUM"submitted by **Dr.Y.R.VALENTINA** to the faculty of ophthalmology, The Tamil Nadu Dr.M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of M.S.Degree (Ophthalmology) is a bonafide research work carried out by her under our direct supervision and guidance.

DEAN

Madurai Medical College

Madurai

Dr. S.V.CHANDRAKUMAR MS., DO.,

Professor and Head

Department of Ophthalmology

Government Rajaji Hospital

Madurai Medical College

Madurai - 625020

CERTIFICATE FROM GUIDE

This is to certify that the dissertation titled"AN OBSERVATIONAL STUDY TO COMPARE THE OUTCOME OF CONJUNCTIVAL AUTOGRAFT AFTER EXTENDED EXCISION OF PTERYGIUM ALONG WITH AND WITHOUT CYCLOSPORINE FOR PRIMARY FLESHY PTERYGIUM"submitted by **Dr.Y.R.VALENTINA** to the faculty of ophthalmology, The Tamil Nadu Dr.M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of M.S.Degree (Ophthalmology) is a bonafide research work carried out by her under my direct supervision and guidance.

Dr. S.V.CHANDRAKUMAR MS., DO.,

Department of Ophthalmology

Government Rajaji Hospital

Madurai Medical College

Madurai - 625020

DECLARATION

I,**Dr.Y.R.VALENTINA** solemnly declare that the dissertation titled **"**AN OBSERVATIONAL STUDY TO COMPARE THE OUTCOME OF CONJUNCTIVAL AUTOGRAFT AFTER EXTENDED EXCISION OF PTERYGIUM ALONG WITH AND WITHOUT CYCLOSPORINE FOR PRIMARY FLESHY PTERYGIUM" has been prepared by me.

This is submitted to **The Tamil Nadu Dr.MGR Medical University, Chennai** in partial fulfillment of the rules and regulations for the M.S.Degree Examination in Ophthalmology to be held in May 2018.

Dr.Y.R.VALENTINA

PLACE: Madurai Medical College, Madurai – 625020.

DATE:

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CONTENTS

Eye is an important part of body exposed to environment. It is protected by many factors like eyelids, eyelashes, periocular fat and the bony orbit.

INTRODUCTION:

During the past decade, there were many debates over the best appearance after pterygium surgery. Many new approaches emerges since the last decade. All those approaches have their merits and demerits in terms of factors like time of surgery, post operative complications, cosmesis and recurrence.

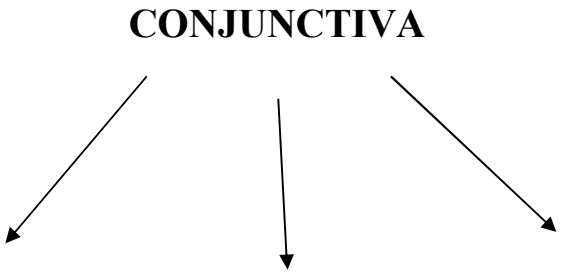
New approaches which attracts our attention were tissue adhesives, autoblood graft fixation, extended pterygium removal followed by extended conjunctival autograft.

Over the past 25 years Professor L.W.Hirst from Australia developed a surgical procedure for removal of ptergium which is a modification of conjunctival autograft. This technique reduces the recurrence rate of conjunctival autograft from 10-15 percentage to the least of 0.1 percentage.This procedure is also associated with good cosmesis.

Topical cyclosporine(0.05%) which is a T cell inhibitor helps in reducing the recurrence rate of pterygium to the minimum with safety.

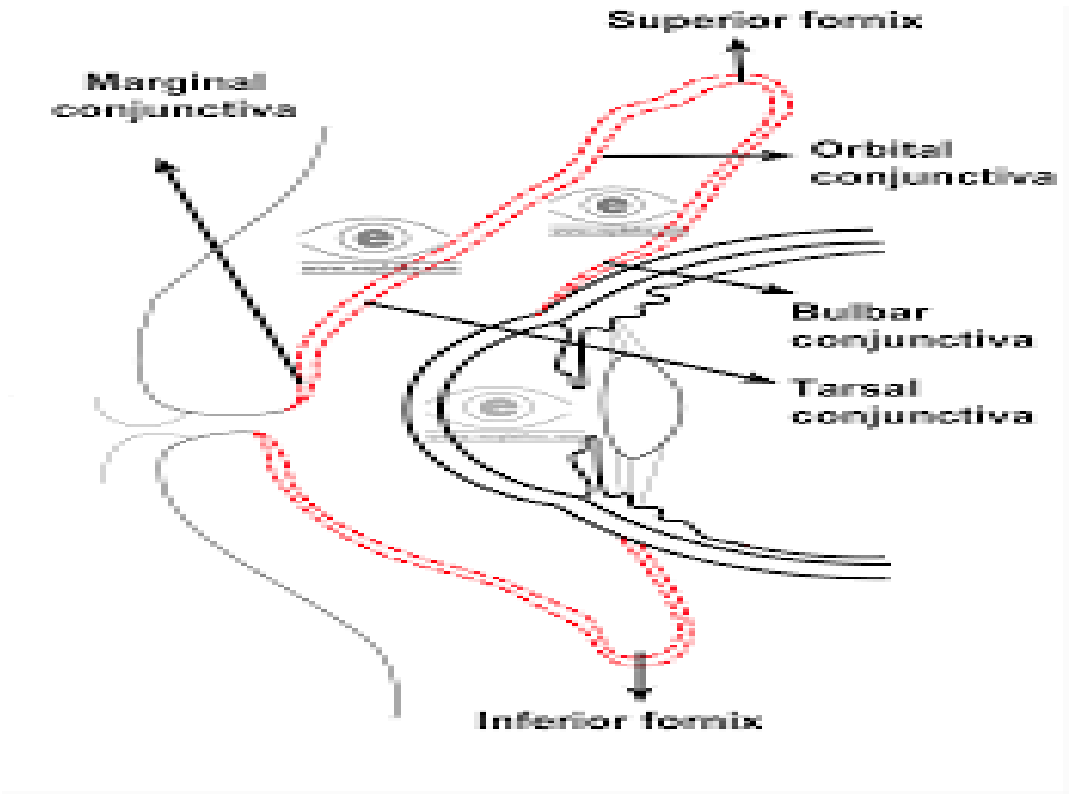
CONJUNCTIVA-ANATOMY:

It is the mucous membrane covering the posterior aspect of lids and anterior aspect of the eye ball except cornea. It encloses a space called conjunctival sac which is formed between lid margin to limbus. It contain caruncle which has sebaceous glands.



PALPEBRAL	BULBAR	FORNICEAL
Marginal	Scleral	Superior
Tarsal	Limbal	Inferior
Orbital		Medial
		Lateral

The conjunctiva has stratified and columnar epithelium which doesn't has basement membrane. It has adenoid and fibrous layer and many goblet cells to secrete the mucin. They are loosely attached to the fibrovascular tissue of substantia propria.


Superior fornix
Marginal conjunctiva
Orbital conjunctiva
Bulbar conjunctiva
Tarsal conjunctiva
Inferior fornix

PALPEBRAL CONJUNCTIVA:

Marginal conjunctiva: Extends from lid marginupto 2mm at the back of lid upto sulcus subtarsalis, which forms a transitional zone between the skin and conjunctiva proper.

Tarsal conjunctiva: It is thin, transparent and highly vascular. It is firmly adherent to tarsal plate.

Orbital conjunctiva: Lies loosely between tarsal plate and fornix.

BULBAR CONJUNCTIVA:

It is thin, transparent and lies loosely over the underlying structures and can be easily moved. A 3mm ridge of conjunctiva around limbus is called limbal conjunctiva and is continuous with the cornea. It is separated from anterior sclera by Tenon's capsule and episcleral tissue. The episcleral tissue and Tenon's capsule to be dissected completely during graft dissection from the overlying pterygium in pterygium excision surgery.

FORNICEAL CONJUNCTIVA: Conjunctival fornix forms a continuous sac which is broken at caruncle and at plica semilunaris.

Fascial sheaths of superior rectus and levator muscle is attached to the conjunctiva which is important while taking a graft from the superio temporal part since it helps in maintaining the recess for the eye movements.

BLOOD SUPPLY TO CONJUNCTIVA:

Derived from superficial branches of anterior ciliary artery a) Marginal arcade of the eyelid, b) Peripheral arterial arcade of eyelid, c) Anterior ciliary arteries

VENOUS DRAINAGE

The venous blood is drained via the eyelid venous plexus and they in turn drain into superior and inferior ophthalmic veins.

LYMPHATICS The lateral part of conjunctiva is drained by pre auricular lymph nodes and medial part is drained by submandibular lymph nodes.

NERVE SUPPLY Bulbar conjunctiva is supplied by long ciliary nerves. Medial inferior forniceal conjunctiva and palpebral conjunctiva are supplied by maxillary and ophthalmic division of trigeminal nerve.

WOUND HEALING OF CONJUNCTIVA:

Abrasions and epithelial defects in a healthy eye usually heal within 1-2 days. Superficial layers cannot regenerate as prior to the insult, but deeper layers on healing adhere more to sclera. Hence prior conjunctival surgeries would be a problem in need of a large conjunctival flap. With increasing age conjunctival

epithelium gets thickened and keratinized, stroma thins and become less elastic, vessels become more prominent and tortuous.

CORNEA:

It is an avascular ,transparent tissue, which contributes to the transmission of light and refraction and aids in the visual function. It has convex outer surface and concave inner surface. The horizontal diameter of cornea is 11-12mm and vertical diameter is 10-11mm. The refractive index of cornea is 1.376

LAYERS OF CORNEA

1] Epithelium

2] Bowman's membrane

3] Stroma or substantia propria

4] Descemet's membrane

5] Endothelium.

Corneal epithelium and tear film contributes to the smooth ocular surface. The degenerative changes of the cornea occurs initially at the limbus.

Cornea plays a main role in development of astigmatism, and hence the refractive surgery. The radial and tangential incisions involving 85-90% the thickness of the cornea helps in flattening the cornea and helps in astigmatic surgery.

TEAR FILM

The tears, is a combination of secretions from the lacrimal gland, Meibomian glands, goblet cells and are drained by nasolacrimal passages. They pass through epithelial surface of cornea and conjunctiva and its vasculature. This optically clear layer is essential for nourishing and protecting the ocular surface, and for good vision, lubrication and comfort.

It is a tri layered structure

- The lipid layer -- 0.1 micron
- The aqueous layer – 7 to 10 micron
- The mucin layer -- 0.2 to 1 micron

THE LIPID LAYER

It is the outermost layer of the tear film which is secreted by the Meibomean / Zeiss glands/ glands of Moll.

Lipid layer deficiency leads to formation of dry spots on the cornea.

THE AQUEOUS LAYER

It is the middle layer contributing more than 90% thickness of tear film. The basic secretors of aqueous layer are goblet cells, accessory lacrimal glands of Krause and Wolfring, and the reflex secretor of aqueous layer is main lacrimal gland.

Deficiency occurs in chemical burns, Stevens Johnson Syndrome, vitamin A deficiency and ocular pemphigoid.

THE MUCIN LAYER

It is the innermost layer covering cornea and conjunctiva, secreted by the mucin secreting goblet cells.The mucin layer is responsible for the water retentive property and helps in wetting of the ocular surface

Mucin deficiency is seen secondary to goblet cell diseases like vitamin A deficiency, chemical burns, Stevens Johnson syndrome and ocular pemphigoid.

LIMBAL STEM CELLS:

The conjunctival stem cells are distributed thorough out the bulbar conjunctiva, concentrated more in conjunctival fornix and posterior to lid margin. The stem cells are a subpopulation of epithelial cells that are self renewable with low mitotic activity.

At least 35 percentage of limbus should be normal for a normal ocular resurfacing and this helps in preventing avascular cornea to become vascularised from the conjunctiva. It prevents the migration of conjunctival cells called conjunctivalisation of cornea.

The limbal stem cells are of proliferative type and helps in renewal of corneal surface. Disruption of the stem cells leads to corneal surface irregularity, vascularisation and leads to pterygium formation.

LIMBAL STEM CELL DEFICIENCY:

Irreversible differentiation of stem cells occurs via transit amplification, which are found at limbus and corneal epithelial basal cells.

The causes of stem cell deficiency are primary and secondary.

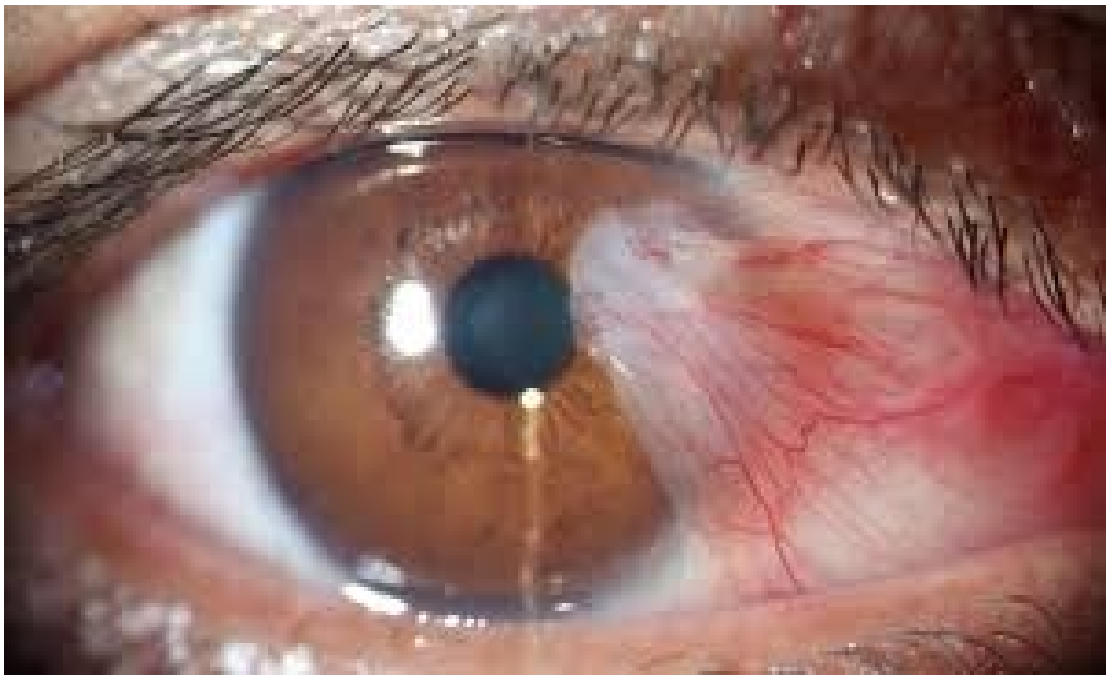
Primary causes are congenital aniridia, sclerocornea, ectodermal dysplasia, and congenital erythro keratoderma

Secondary causes are pterygium, chemical and thermal burns, dysplastic and neoplastic lesions of limbus and chronic cicatricial conjunctivitis.

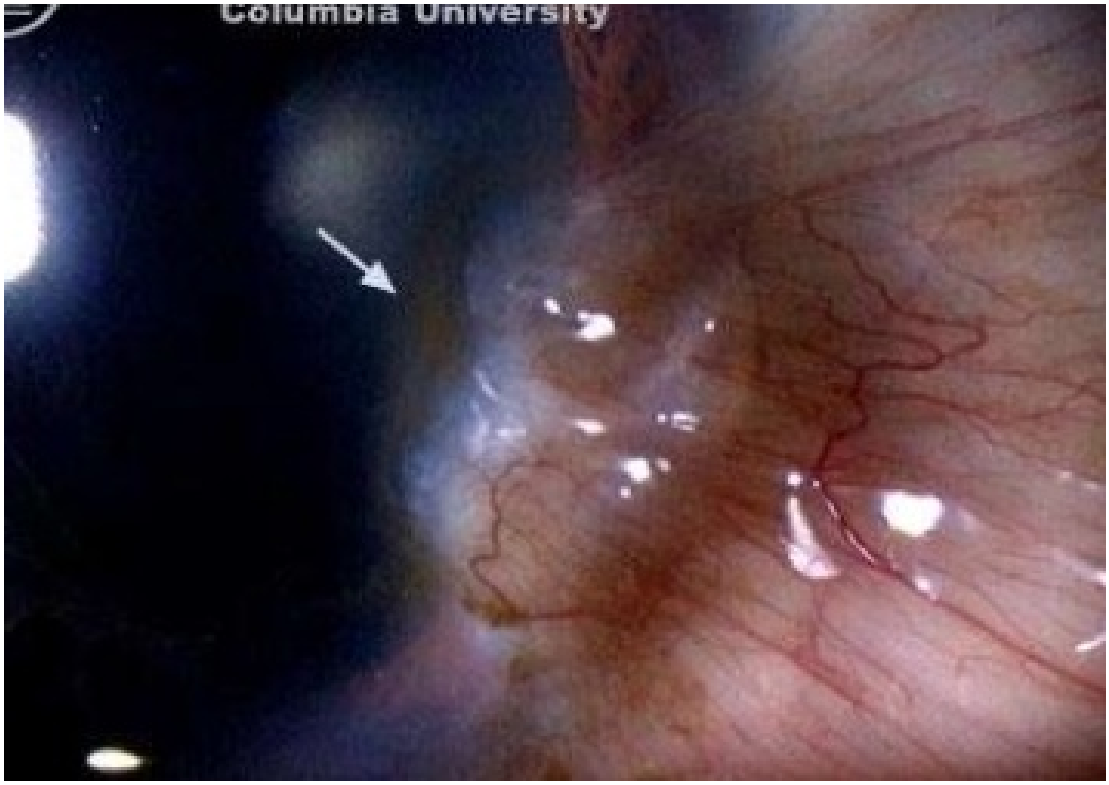
Impression cytology of corneal surface reveals goblet cells and conjunctival epithelium. Stem cells can only be identified by indirect methods like clonal expansion and slow cycling identification.

PTERYGIUM

The word pterygium is derived from the Greek word ‘ Pteryx’ which means ‘wing’ which was coined by Walton. It is a wing shaped vascular conjunctival tissue overgrowth on cornea. It is the commonest ocular surface disease. It is also called Surfer’s disease. It is a degenerative disease, which is featured by proliferation, inflammatory infiltrates, fibrosis, angiogenesis and extracellular matrix breakdown. Pterygium is a common problem in India. It advances and encroaches over the cornea obscuring visual axis and impairs vision and also causes ocular discomfort.



STOCKERS LINE



Many surgical and medical modalities of treatment have been employed for treatment of pterygium. But recurrence continued to be a big problem.

In our study with extended pterygium removal with extended conjunctival autograft and postoperative cyclosporine, the recurrence is very minimal in case of advanced pterygium.

EPIDEMIOLOGY:

It occur mostly in dry and hot climates, with prevalence rate higher in the tropics with the equatorial countries mostly affected-usually known as Pterygium belt. It is thought to be due to excessive fibro vascular proliferation on the ocular surface due to increased sunlight exposure, genetic predisposition, geographic location contributes to pterygium formation.

PREVALENCE

Prevalence of pterygium is more common near equator with a prevalence of 22.5%. In India the prevalence is 5.2 percentage with the highest prevalence in Myanmar with 19.6 percentage.

In children, pterygium is uncommon. It usually presents between the age of 20 and 50 years. Men are affected twice than women due to their outdoor activity. People who work for extended periods in outdoors [fisherman, farmer, beach goers, rural workers] with progressive age have high incidence of pterygium. Taylor and co established the association of U-V rays exposure with exposure

of pterygium. It is more common in some races. It tends to occur in families. Recurrence is more common in younger age group.

CAUSE

1] Chronic exposure to UV –B irradiation

2] Pingecula

3] Localised limbal stem cell anomalies

4] p-53 gene mutation

5] Humanz papilloma viral infection

6] Imbalance of tissue inhibitors of metallo proteinase and matrix metallo proteinase

HISTORY:

Pterygium is the most common pathology which has been recognised early from Sushrata's period onwards. He was the first person to remove the pterygium.

Many theories were proposed regarding the formation of pterygium by von Arlt, Theobald, Cameron etc. like neoplastic, inflammatory, vascular, ultraviolet radiation theories.

And many techniques of pterygium removal by Scarpa, Von Arlt, Caldwell, Kenyon , Panzardi like baresclera excision, excision with simple closure, Xray/ Argon laser, conjunctival autograft, amniotic membrane grafting respectively.

Conjunctival autograft to prevent pterygium recurrence is gaining an increase in popularity. L.W.Hirst from Australia performed extended pterygium removal with extended conjunctival autograft with low recurrence rate is being popular.

ETIOPATHOGENESIS

Ocular surface changes and Pingecula:

Association between pterygium and dry eye was supported by many studies. Reduced tear break uptime, upregulation of phospholipase D (PLD)were supported by many theories as formation of pterygium. PLD is involved in apoptosis and inflammatory process. Anderson explained the relationship between pterygium and temperature. Eliot explained the constant exposue to wind causing pterygium.

Zehender proposed Pingecula to be a precursor of pterygium which was reaffirmed to be a growth of hyaline and elastic tissue along with degenerative changes in the conjunctiva that progressively grows into cornea and develops into a pterygium. During the growth of pterygium, pingecula is supposed to be found in head of pterygium.

Sugar proposed a degenerative change in pterygium that leads to hyperplasia and hypertrophy and hyaline deposition that lifts up and separates Bowmans membrane from epithelium and the connective tissue laid down contracts and pulls them over to the cornea leading to pteygium formation. D'ombrien was of the opinion that when a pingecula was closer to limbus it becomes pterygium.

Exposure to UV rays:

There is a strong correlation exists between sunlight exposure and occurrence of pterygium. UV radiation in the early ages of life tends to create biochemical, genetic, and morphologic changes that later in life presents as pterygium. Eyebrows, superior orbital rim, nasal prominence protect the exposure superiorly, but eyes are less protected temporally and inferiorly. UV light damages localised stem cells leading to conjunctivilisation over cornea

The UV radiation causes corneal protein denaturation leading to antigen antibody reaction and hence fibrovascular proliferation. A study conducted in rural Australia among 1,00,000 residents proved positive correlation between UV radiation exposure and recurrence of pterygium.

Inheritance:

Heredity plays some role in the pterygium recurrence. Recently the proposal is that the mutation p53, a tumour suppressor gene plays a vital role in the

pathogenesis. Due to loss of heterozygosity, point mutations of proto oncogene, and microsatellite instability leads to pterygium formation.

Knudsons “two hit hypothesis” suggested the role of tumor supperesor gene involvement. First hit by tumor suppressor gene deactivation and second hit by environmental factors.

Oxidative stress:

Oxidative stress induces protein survivin which causes DNA oxiadation and downregulation of P53. Deposition of iron along the head of pterygium is suggested due to oxidative stress. Hence topical antioxidants have some role in the treatment pterygium.

Microtrauma:

Mechanical irritation by dust particles play an important role in formation of pterygium which is explained by the high occurrence of pterygium in sandy environment.

Growth factors:

Microtrauma and UV radiation induces the release of various cytokines and growth factors. Epidermal growth factor, heparin binding epithelial growth factor, vascular endothelial growth factor, basic fibroblast growth factors were found to be involved in pterygium, which was confirmed by RT-PCR analysis.

Limbal stem cells:

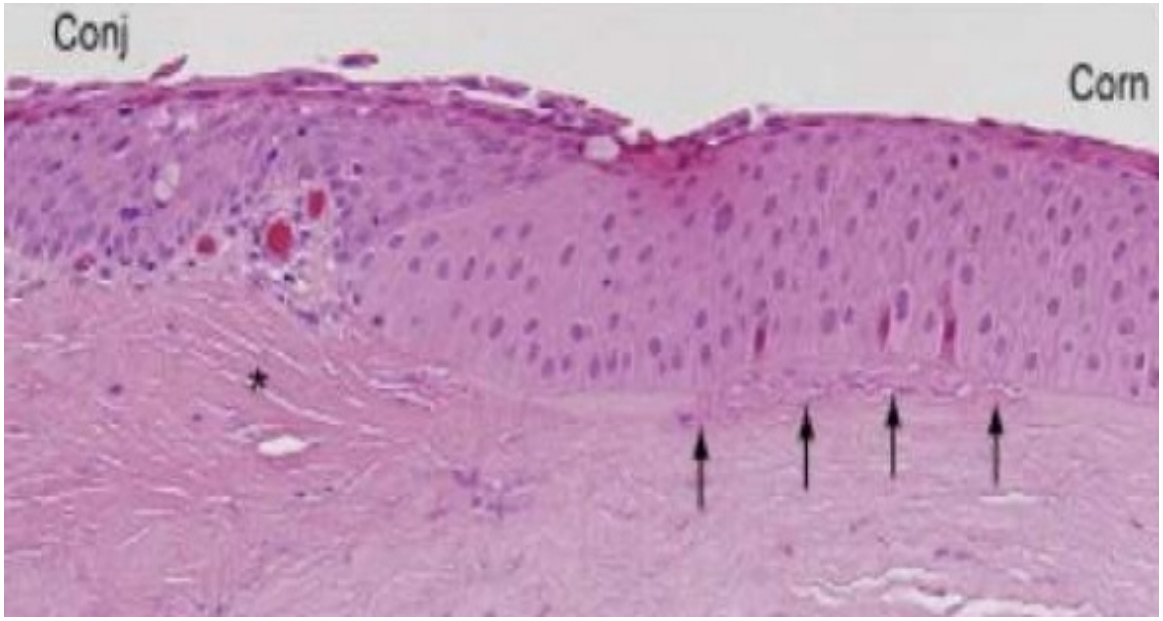
Limbal stem cells niche is located in palisades of Vogt. According to Noel, stem cells are vital for corneal epithelial regrowth and they act as a barrier to prevent conjunctival ingrowth in cornea. This process known as conjunctivilisation is a hall mark of stem cell deficiency. UV radiation and chronic irritation releases vasoproliferative substances which causes the pterygium recurrence.

HISTOPATHOLOGY:

Histopathologically pterygium has hyperplastic elastotic degeneration. It has abnormal elastic fibres that stain for elastin but not degraded by elastase. It has conjunctival loose fibrous connective tissue with vascular ingrowth into the cornea invading upto the anterior stromal layer destroying Bowman's membrane. It also has a sub-epithelial connective tissue hyalinization of degenerating collagen tissues. Chronic exposure to UV rays causes holes in the

Bowman's membrane in areas of necrosis called colander degeneration, which means pterygium is active and progressing.

Elastotic degeneration was first postulated by Hengan and Alvardo, which was due to degenerative collagen, abnormal fibroblstic activity and abnormal ground substance.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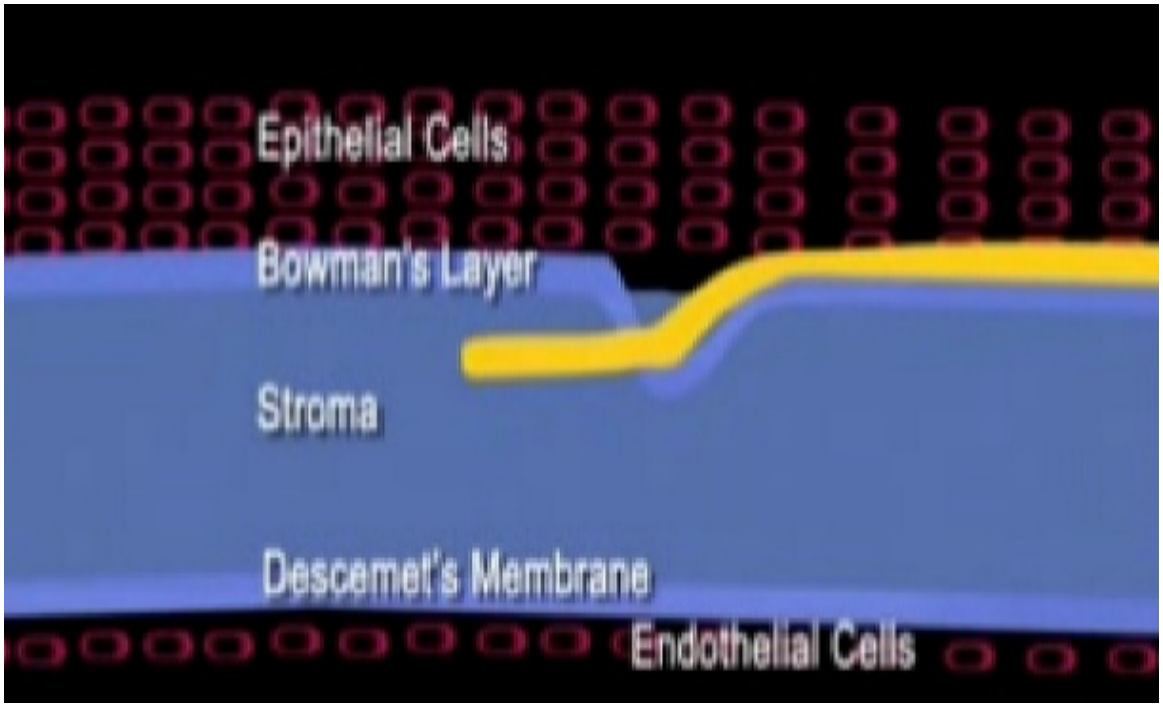

Epithelial Cells
Bowman's Layer
Stroma
Descemet's Membrane
Endothelial Cells

The body of pterygium binds with the episcleral tissue. Hence it is mobile over the sclera. Head of pterygium prepares a path for the pterygium as the fibroblasts advances in between epithelium and bowman's membrane. During this process the Bowman's layer of the cornea is pushed behind which leads to break up of the layer. These opening helps in the growth of pterygium in to the anterior stromal layer making it firmly adherent with it.

Body of the pterygium histologically proved to show tubular glands and spaces. This together makes the cystic spaces in pterygium. It also clearly showed T lymphocytic infiltrations. Other histological changes include squamous cell metaplasia with increase number of goblet cells and acanthosis.

CLASSIFICATION:

SLIT LAMP GRADING by TAN's:

According to morphology

T 1-- Atrophic and transparent form with clearly visible episcleral vessels.

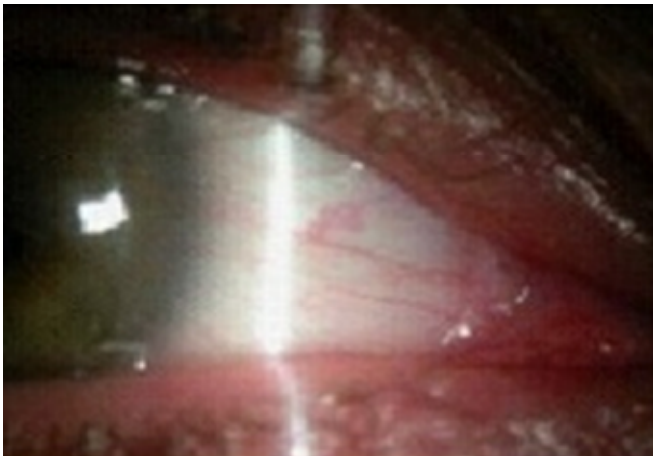
T 2 – Intermediate form with partially visible vessels.

T 3 – Fleshy and opaque form with totally obscured episcleral vessels.

MORPHOLOGICAL STAGING

According to Doherty, it is classified as progressive, stationary and regressive types.

SLIT LAMP GRADING BY TAN'S



GRADE I

GRADE II

GRADE III

PROGRESSIVE PTERYGIUM

It is a more fleshy mass which appears succulent. It does not have a Stocker's line. This is an actively growing stage of pterygium which is fleshy and vascular with hyperaemic neck and voluminous head. The progressive pterygium appears to be inflamed. It is also known as 'Pterygium vasculosum cornosum or crassum'.

STATIONARY PTERYGIUM

It is less vascular and develops a Stocker's line which is deposition of iron into Bowman's membrane due to pooling of tears. This type of pterygium stops growing hence it is called as stationary.

REGRESSIVE PTERYGIUM

This is a thin, grey, papery, anaemic and membranous pterygium seen in old age people. The grey apex appears as a corneal opacity. In real, pterygium never becomes smaller nor regressing. Regressive stage is due to its appearance.

BASED ON RECURRENCE by Townseed,

1]Actively growing

2]Fleshy

3]Slowly growing

4]Stationary

5]Atrophic

Pseudo pterygium:

It was first differentiated from true pterygium by Wanther.

FEATURES	TRUE PTERYGIUM	PSEUDO PTERYGIUM
ETIOLOGY	Degenerative process Occurs due to chronic exposure of sunlight and dust	Inflammatory process Occurs secondary to chemical burns, trauma or surgery
AGE	Common in older age group	Occurs in any age group
SITE	Found usually at the interpalpebral area	Occurs anywhere on the cornea
LATERALITY	Usually bilateral	Usually unilateral
STAGES	Progressive, stationary, regressive	Always stationary
ADHERENCE TO LIMBUS	Present	Does not adhere to limbus
PROBE TEST	Negative	Positive- glass rod can be passed beneath it.

RECURRENCE PTERYGIUM:

Regrowth of the pterygium after surgical excision is defined as recurrent pterygium. It is the regrowth of pterygium like fibrovascular growth which crosses over the limbus, also it attains the same amount of encroachment as the original lesion, or even a re growth exceeding 1 mm more in to cornea. It is strongly adherent to limbus and involves sclera and corneal stroma and sometimes the rectus sheath.

Recurrent pterygium grows over the cornea encroaching the same amount as the original lesion or exceeding it. If rectus muscle sheath is involved, restricted ocular motility can occur.

Usually it develops within 6 months of surgical excision. It is more common in individuals with high UV exposure and with aggressive growth pattern. It usually occurs in young adults. Histologically, the recurrent pterygium showed no elastotic degeneration and it is firmly adherent throughout its underlying structure with more fibrovascular growth.

MALIGNANT PTERYGIUM:

It is a recurrent pterygium with restriction of ocular movements.

PARTS OF PTERYGIUM:

Pterygium is divided into various parts for ease of clinical description.

- **Body** is the widest part, which grows over the limbus and bulbar conjunctiva. It usually has semilunar fold and caruncle while it is nasally situated.
- **Neck** is the part which lies between head and body of pterygium. It is the narrowest part that further extends into cornea.
- **Apex** is the most inferior part of head over cornea
- **Head** is the most central extension of pterygium, which lies over the cornea
- **Cap** is the sub epithelial avascular part of pterygium [Fuch's island] usually presents with a Stocker's line which is a red brown iron line.

STOCKER'S LINE– is a pigment line due to iron deposits seen infront of apex of pterygium. It occurs due to pooling of tears. Presence of iron is demonstrated by Prussian's blue or Perl's test.The centre of the leading edge has the Stocker's line, where the tear film is abnormal. It indicates the long duration of pterygium.

FUCH'S PATCHES--These are the grey coloured spots seen over head.

Body of the pterygium is adherent to the underlying Tenon's capsule and spares the episclera, while the neck is adherent to episclera and sclera at the limbus due to the absence of tenons capsule. The head grows between Bowmans layer and basement membrane of the corneal epithelium. The basement membrane is pushed posteriorly and the pterygium invades the superficial stroma of the cornea.

WHY PTERYGIUM OCCUR MORE IN INTERPALPEBRAL REGION?

1} Nose reflects the UV light , which results in the increased actinic exposure in that area.

2} The light is focussed from temporal cornea to nasal conjunctiva through the anterior chamber.

3} The light incident nasally was 20 times more than that temporally.

SYMPTOMS:

It is mostly asymptomatic. Pterygium in many of the patients remains a cosmetic problem otherwise it does not produce any symptoms. It is not so common for a pterygium to get inflamed.

- Decrease in visual acuity
- Blurring of vision
- Irritation / foreign body sensation
- Lacrimation
- Double vision

VISUAL ACUITY:

1) The pterygium may encroach up on the visual axis and affects the peripheral vision first and central vision later.

2) Astigmatism – a) a large sized pterygium growing interpalpebrally creates a traction due to the contractile elements in it leading to flattening of cornea, producing with the rule astigmatism b) pooling of tears at head of pterygium.
3) Pre existing corneal astigmatism
4) The amount of significant astigmatism produced by pterygium itself is an indication for surgery, and no need for one to wait till the visual axis encroachment.

DIPLOPIA

Binocular diplopia occurs more common with large sized and recurrent pterygium. Because of the traction on the conjunctiva it limits eye movement.

DRY EYE SYMPTOMS

Factors like UV light exposure, hot, dry climate, genetic predisposition leads to dry eye disease which further induces the proliferative growth when it is not adequately treated. Hence it is advisable to grade dry eye and treat it, before treatment of pterygium.

DIFFERENTIAL DIAGNOSIS

1) Pingecula
2) Phlycten
3) Nodular episcleritis

4) Pseudo pterygium
5) Traumatic pannus
6) Conjunctival intra epithelial neoplasia

INVESTIGATIONS

VISUAL ACUITY – Snellen chart

ASTIGMATISM – Astigmatism is a condition of refraction in which point of light can not be formed on the retina. It may be due to a change in the curvature, or centering, or refractive index. Instead of a single focal point there will be two focal lines which are separated by focal interval.

INVESTIGATIONS FOR ASTIGMATISM

Retinoscopy, Keratometry, Automated refractometer, Astigmatic fan, Jackson cross cylinder

DIAGNOSTIC TEST FOR TEAR FILM DYSFUNCTION

1) Tear meniscus measurement—measured by slit lamp biomicroscopy. Normal height is 0.2 mm
2) Tear break up time :

   Fluorescein strip is moistened and applied to the inferior tarsal conjunctiva. Several blinks to be made. Under cobalt filter in the slit lamp biomicroscope using a broad beam tear film is examined. The time

between the last blink and appearance of the first dark discontinuity in the fluorescein stained tear film is noted.

3) Schirmer test :

   Whatmann filter paper number 41 is kept in the lower fornix. Schirmer test is measuring the wetting of the strip in mm with in the first 5 minutes. This test is performed both with and with out anaesthesia. Less than 5 mm wetting in 5 minutes is indicate dry eye.

4) Corneal sensation should be assessed.

GRAFT DEHISCENCE GRADING:

Grade 0: well apposed graft

Grade 1: gaping present with one side of four margins displaced

Grade 2: gaping with two sides displacement

Grade 3: gaping with three sides displacement

Grade 4: all four sides completely displaced from bed

MANAGEMENT:

HISTORY OF PTERYGIUM AND ITS SURGERY

Susruta, an Indian and the world's first surgeon and ophthalmologist was the first who described about pterygium and its surgical removal around 1000 B.C. Later his original surgical technique was modified by Celsus [29 A.D],

Vagblat [3-4th century], Paul [600 A.D], Rhazes [932 A.D], Avicenna [1037 A.D],Chakradatta [1060A.D].

Various forms of collyrium of lead,white wine, silver nitrate, bile, zinc, lead acetate, iron, mercuric lanoline, cuttlefish bone, water of Euphrasia had been tried by various practitioners like Demarres, Maitre Jean, Saint Yves, Hippocrates,Galen, Celsus, Archigenes, Aetius.

Various ancient surgeons tried lot of surgical techniques and about their complications. Around 1AD, Celsus from Rome lifted the pterygium from sclera by a scalpel and thread under it. Horsehair was used by Paul of Argentina to remove the pterygium. Surgeon from Baghdad, named Ali bin Isa classified pterygium into soft and hard varieties and he had advised surgery for red and hard form of pterygium.

In 1771, Acrel removed head of pterygium using bistoury. Bare sclera excision of Pterygium was introduced by Scarpa during early 1800. In later stages, various surgeons used to remove pterygium by cauterization using various compounds like chromic acid, carbonic snow, silver nitrate and nitric acid. To avoid recurrent growth of pterygium, Coccius and Arlt used suture techniques along with bare sclera.

Desmarres tried to mobilize a conjunctival flap into lower fornix and transplanted between pterygium and margin of cornea. Upper Forniceal

mobilization technique was performed by Terrien. Hobbs used galvano cautery and thermal cautery was used by Coe and Loring in pterygium removal. In 1876, Klein used free tissue grafts like mucous membrane after pterygium excision. Pedicle conjunctival flap graft technique was used by Elschnig.

Preserved homografts from foetal cornea was the earliest form of corneal grafting which was done by Morax and Magitot during early 1900s.Radiation techniques using radon in preventing recurrence was practiced by Burnam and Neill. Hughes and Swanberg used beta radiation after to prevent recurrence.

Kenyon et al after having good knowledge about the conjunctival anatomy gave a new methodology of conjunctival autograft. Though the technique initially

MEDICAL MANAGEMENT:

The decision about the type of management is influenced by both patient's and surgeon's factor. Main factor that helps in making the decision about treatment is the amount of symptoms like irritation, inflammatory changes , effect on the vision , and cosmetically how it appears. Symptoms like irritation and inflammation used to be self limiting. When it goes beyond self limitance it can be tackled with judicious use of lubricants, topical vasoconstrictor, NSAIDS, cyclosporine, or steroids.Sub conjunctival injection of hyaluronidase have been tried.Steroids are limited for postoperative inflammation and for restriction of

further proliferation. Mild to moderate amount of astigmatism due to pterygium can be treated with glasses. Regarding contact lenses, scleral lenses are theoretically better option to rigid gas permeable lenses.

Many of the Indian patients experience recurrent episodes of the same symptoms because of their work associated exposure or environmental exposure. Theoretically change of environment, work, or limitation of UV light exposure though helps in limiting or preventing the disease to some extent it is not practical many times. Regular use of brimmed hat, dark sun glasses, wrap around moisture chamber glasse help in preventing the progression of disease.

According to Rich et al " to manage pterygia, we can incise, excise, bury, transplant, graft, freeze, burn, cauterize, diathermize, divulse, evulse, chemically assult, irradiate, or simply leave them to fate."

SURGICAL MANAGEMENT:

It is the main mode of treatment. All the authors who succeeded in describing modified surgery were based on the original surgical procedure recommended by Susruta.There are a number of surgical techniques available for its management. The basic surgical principle in its management is its removal. But each and every method differ in how the conjunctival defect that is created and handled and the adjunctive methodology taken in an attempt to give a safer cosmetically acceptable, and primarily a recurrent free procedure.

The ideal procedure is one which depends upon conjunctival defects the pterygium has produced, the size, extent and depth of growth and the cosmetic effect after removal. It should be recurrence free. Over the centuries a number of procedures has evolved but none has completely satisfied the criteria like safer procedure, cosmetically acceptable, and a recurrent free procedure. Even in modern days a study design for optimal outcome of results are not available due to the broad range of geographic location of the disease, differing levels of ultraviolet exposure levels, differing techniques of management for dissimilar patients, low levels of compliance of follow up, and inconsistent definition of recurrence. Hence recurrence definition and its criteria should be acceptable.

INDICATIONS FOR SURGERY:

- Extension to the visual axis and hence threatening the vision
- Visual loss from induced astigmatism
- Recurrent irritation leading to intermittent inflammation
- Restriction of ocular movements due to pterygium
- Cosmetic
- Failure of medical therapy
- Binocular diplopia
- Before corneal refractive surgery
- Difficulty in contact lens fitting

SURGICAL TECHNIQUES:

1) **Excision:**

a) Simple excision

b) Bare sclera technique

2) **Transposition**

3) **Plastic repair**

a) Sliding flap closure

b) Rotational flap closure

c) Z plasty

4) **Transplantation**

a) Amniotic membrane transplantation

b) Conjunctival autograft transplantation

c) Limbal conjunctival autograft transplantation

ANESTHESIA:

A peribulbar or retrobulbar is preferred anesthesia. This is necessary specifically for creation of conjunctival flaps, conjunctival autografting, amniotic membrane transplantation where careful dissection, control over the globe position, good hemostasis, closure with precise suturing.

A 70:30 combination of 2% lignocaine with 0.75% of bupivacaine along with 1%apraclonidine pre operatively gives good conjunctival blanching. Also

frequent instillation of 1:1000 adrenaline or 2.5% of phenylephrine aids in good hemostasis.

EXCISION OF PTERYGIUM:

SIMPLE EXCISION:

Simple and oldest method of pterygium removal which includes suturing of the free margins of conjunctiva after excision of fibrovascular growth. It has a high recurrence rate of 30-90%

Historically surgical attempts were made towards redirection of pterygium's head away from cornea into either of the fornix. Modern technique is to excise the pterygium. Casterveijo recommended a simple way of superficial keratectomy for pterygium removal. Care should be taken not to damage the rectus muscle while cleaning up near the adjacent tissue.

BARE SCLERA TECHNIQUE:

Mac Garis and D'ombrain introduced this technique. It is the quickest technique with high recurrence rate of 5-89%

After completion of the pterygium excision the conjunctival edges retract leaving behind a bare sclera of slightly sized bigger defect than the size of the excised pterygium. It is basically a simplest surgical method in pterygium treatment. The principle behind leaving a bare sclera is the conjunctival stem cells will migrate over the area of defective bare sclera.

TRANSPOSITIONS:

These techniques were planned after high recurrence rate of excision technique. Head of pterygium was believed to be the cause of recurrence, hence Desmarre transplanted the head of pterygium into a conjunctival slit and sutured it as a flap.

Another technique introduced by Reynolds, who buried the head into the conjunctiva without cutting it and fastening it with sutures near inferior rectus insertion.

SLIDING FLAP PROCEDURE:

Mc Coombs et al.,(1994) gave an idea of bringing down healthy conjunctival flap into the defect created by excision. This technique has a recurrence rate of 45%.

ROTATIONAL FLAP CLOSURE:

The U shaped incision is made adjacent to the wound to form a tongue of conjunctiva which is rotated into place with a recurrence rate of 4%

Z plasty:

V shaped conjunctival flap that is created into which the body of pterygium is directed and sutured along limbus and is associated with recurrence.

Complications of flap include button holing, retraction and erosion of flap and recurrence.

AMNIOTIC MEMBRANE ALLOGRAFTING:

History:

The amniotic membrane use in clinical medicine was first documented by Davis. He used both amnion and chorion for skin transplantation. Panzardi(1947) was the first to use amniotic membrane in pterygium excision. In those days processing and preservation of the tissue was not easy and it made its availability limited. Kim and Tseng in 1995 introduced with better tissue techniques for use in ophthalmology.

MECHANISM OF ACTION:

- Promote differentiation of epithelial cells
- Substrate for migration of epithelial cells
- Helps in attachment and prevent apoptosis of epithelial cells
- Helps in decrease of inflammatory cell infiltrate and reduce fibrosis and neovascularisation.

FEATURES:

Due to the presence of type 4 collagen and laminin in the amniotic basement membrane it resembles close to the composition of conjunctival basement membrane than that of cornea. In addition it also has collagen type 3.

The expression of cytokines in amniotic membrane epithelium was recently evidenced. This cytokines helps the amniotic membrane to decrease the inflammation, scarring and lastly neovascularisation. Amniotic membrane also has nerve growth factor, keratocyte growth factor, epidermal growth factor serving a role in epithelialisation of the ocular surface.

AMG epithelial cells express interleukin-1 receptor antagonist, matrix metallo proteinase inhibitors, interleukin-10 , thrombospondin-1 which are all potent anti angiogenic agents. Also AMG traps the apoptotic inflammatory cells like monocyte macrophage lineage.The other interesting part of the amniotic membrane transplantation unlike other allograft transplantation is it doesn't require immunosuppressive therapy because the graft membrane typically gets dissolved within a period of 3 to 5 weeks. Though amnion is supposed to be an immune privileged tissue, all the parts of it contain HLA class 1 and 2 antigens and it does have enough strength to suppress alloreactive T cells in vitro.

Epithelial side of basement membrane is differentiated from stromal side by touching the sticky side with Weck-cell sponge.

TECHNIQUES:

OVERLAY TCHNIQUE: The membrane is kept with epithelium side down.

INLAY TECHNIQUE: The amniotic membrane is kept with epithelium side up i.e basement membrane down. This can be laid as in 1 or multiple layers depending on the stromal defect. An overlay can be proceeded over an inlay.

PROCEDURE:

After peribulbar block the pterygium is excised from the bed. Amniotic membrane graft is stained with 1% Lissamine green dye for better visualization during the procedure. Ideally the graft should be 20% larger than the defect. The graft is placed depending on the onlay/ inlay technique and is sutured with 8'O vicryl to the edges of the conjunctiva along with episcleral tissue and obtain a perfect hemostasis. Pad and bandage is applied.

ADVANTAGE:

- It can be substituted in place where large graft is required.
- Avoids iatrogenic damage to the normal conjunctiva.
- It is technically easier and faster.
- AMG along with Limbal or conjunctival auto graft is more successful.

DISADVANTAGE:

- Delayed vascularisation leading to recurrence.
- Higher recurrence rate than autograft.
- Risk of infection.

CONJUNCTIVAL FLAP:

Conjunctival flap concept was first introduced by Schoeler and was popularised by Khunt. Purse string flap and Hood flaps were described. Gunderson was the one who described the technique of conjunctival flap which is used even today.

Gunderson designed a thin flap by dissecting underlying tenon's fascia which remain success even today. His technique is successful even today for the fact that because of the removal of the Tenon's fascia the flap showed reduced contractility. There by allowing a permanent coverage of the diseased area. For decades conjunctival flaps were used in the treatment of pterygium surgery. The technique most commonly used are sliding, pedicle type flaps and rotation flaps. The conjunctiva if harvested from inferior or superior bulbar conjunctiva close the bare sclera, it is called as sliding conjunctival flaps. The recurrence rate of the various techniques ranged from 1-5%.

CONJUNCTIVAL GRAFTS

The autologous conjunctival graft use in the ocular surface reconstruction was first done by Thoft. Conjunctival auto graft is now used as the procedure of choice in both primary and recurrent pterygium surgery. In 1985, Kenyon et al introduced the basic technique of conjunctival auto graft. Autologous grafting procedure covers a wide variety of diseased ocular surface treatments like

ocular surface tumours, chemical injuries, cicatricial entropion and plastic construction of lid.

ADVANTAGES

1. Relative low recurrence rate.

2. Absence of life threatening complications.

3. Near normal anatomic supplement.

4. Cosmetically better.

5. Undergoes a natural repair process.

6. More efficacious.

7. Long durability and safety.

BASIS FOR USING CONJUNCTIVA AS GRAFT

This technique provides a normal conjunctival mucous membrane with a superficial vascular network and other cells providing stem cells, columnar cells and the normal goblet cells. Following grafting the normal cells of the conjunctival surface spread over abnormal surface. This migration of cells can be seen and can be outlined by its patterns with use of fluorescein. The abnormal cells can be tracked by Rose Bengal stain.

The advantage of conjunctival auto graft over mucous membrane grafting is very minimal graft shrinkage associated with a normal reparative process due to secondary intention closure. Thin conjunctival flaps allows faster revascularisation and also eliminates subepithelial fibrosis and shrinking of the graft, thus decreasing the inflammatory and scarring stimulus. Hence the best cosmesis is obtained with the conjunctival graft procedure and also the lowest recurrence rate.

METHODS:

The following to be measured before obtaining the graft like width at the limbus, width of the nasal lesion, limbus – nasal margin distance.

SURGICAL CONSIDERATIONS:

In mild cases simple conventional techniques like conjunctival Z plasty is used. In cases of severe tissue destruction and advanced scarring a free conjunctival mucous membrane graft is used. Before attempting any kind of procedure the presence of inflammation, and necrosis to be treated because a neglect may lead to unsatisfactory result like failure of graft. But in cases like progressive disease due to a lack of adequate stem cells has to be intervened.

TECHNIQUE:

The first step is graft site preparation. Next is the measurement of the recipient bed size and the donor graft requirement. The excessive thickened

Tenon's capsule is removed which helps in debulking the recipient bed thereby allowing an enhanced adherence and acceptance of the graft giving a better cosmesis and functional outcome.

The usual site of conjunctival autograft is supero temporally either ipsilateral or from contralateral eye. As the donor site is in an oblique location inadvertent injury to the extra ocular muscle should be avoided and healing at this site is better. The autograft harvest site is marked with surgical ink. 1% lignocaine with 1/ 100000 adrenaline is injected sub conjunctivaly with a 30 gauge needle. This helps in the separation of Tenon's fascia from the surface mucous membrane.

Nasal and temporal margins of the harvest site is superficially incised carefully using a crescent knife placed vertically. Now the Limbal and the Forniceal margin are the fixation points for dissection. With the help of a Westcott scissors or Vanas the Tenon's is separated and the Forniceal margin is cut and reflected over cornea. After laying the flap over the defect press it over the cornea so that sub epithelial fibres over the sclera becomes taut. Finally the anterior limbal border can be cut, with or without including the Limbal palisades of Vogt. At the limbus dissection should be parallel to it.

The donated site is not closed. It is left bare. Over years of experience it is seen that bare area created get re-epithelialised without shrinkage. Routinely the graft is sutured in the limbal end with 10-0 nylon suture. Multiple equidistant

interrupted sutures are done. After suturing, the sutures are cut a little longer allowing movement while blinking.

For the first 3–5 days post op, the graft appears edematous and avascular. Adherence of the graft occurs in 7–10 days. The graft appears normal within 2 months of procedure.

Recurrence rate associated with this procedure is 2-39%

VARIATIONS;

Narrow strip (juxta Limbal) of the graft

Limbal epithelial auto graft

Limbal conjunctival auto graft

Rotational conjunctival auto graft

SUCCESSFUL GRAFTING:

1. Atleast 1mm bigger sized graft.

2. Complete removal of pteryium

3. Tenon free graft and graft stabilization

PTERYGIUM EXTENDED REMOVAL FOLLOWED BY EXTENDED CONJUNCTIVAL AUTOGRAFT (P.E.R.F.E.C.T)

PERFECT – pterygium extended removal followed by extended conjunctival transplantation was described and practiced by Professor L.W. Hirst. Here about 15 mm / 12 mm bare scleral area is created with removal of pterygium which is covered by a graft of similar size.

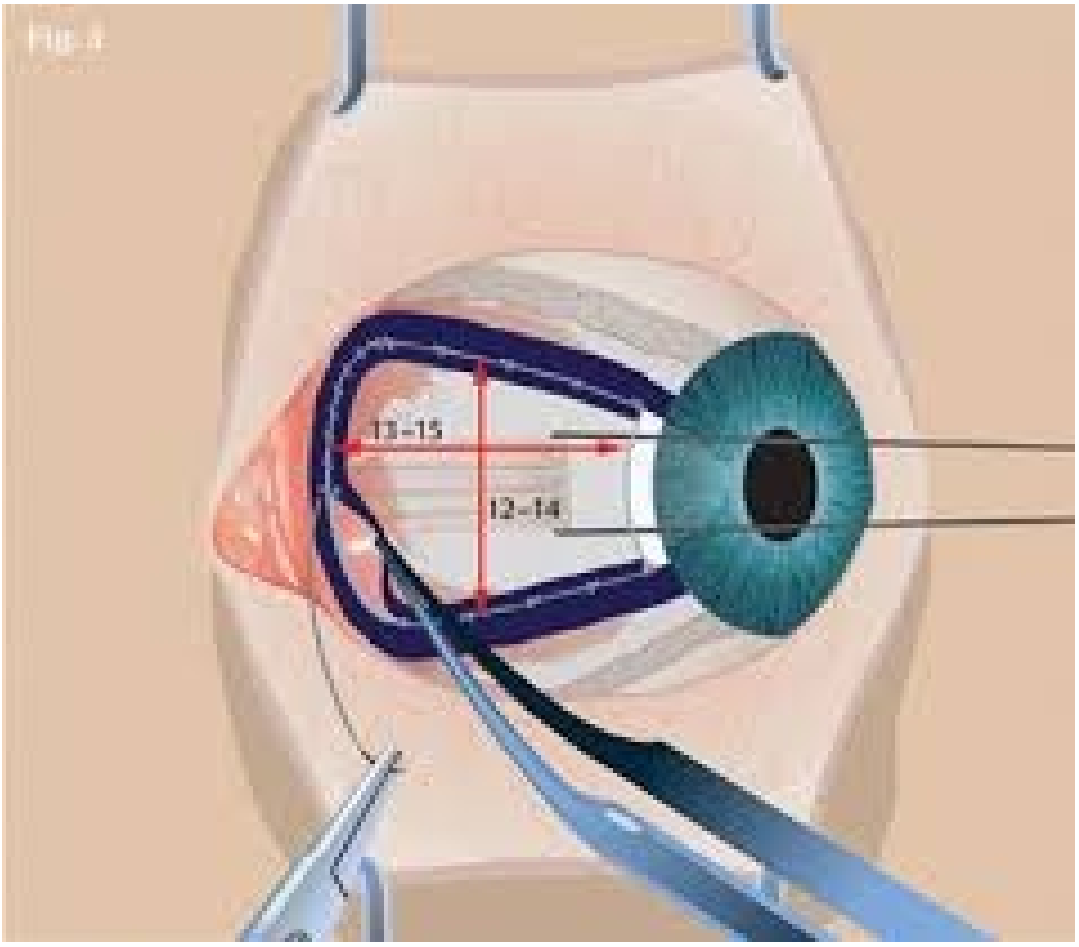
He did 1000 PERFECT surgeries with 0.1% recurrence rate . The surgical procedure took more than one hour.

Another case series study of P.E.R.F.E.C.T. for PTERYGIUM was conducted with a one year follow-up to assess the recurrence, complication rate, and cosmesis. In this series, P.E.R.F.E.C.T. for PTERYGIUM resulted in a zero recurrence rate with few complications and a good cosmetic appearance.

Aim is to reduce the recurrence rate by

- extensive excision of Tenon's fascia superior, inferior, and nasal to the pterygium
- intensive use of postoperative topical corticosteroids

Improved cosmesis in PERFECT surgery is due to, A nasal suture, which mimics a semilunar fold and hides any scar in that area which is achieved by


13-15
12-14

suturing the extreme corners of the graft to the sclera, 13 to 15 mm posterior to the limbus and suturing paracaruncular edge of the graft to the residual 2 to 3 mm fringe of conjunctiva left at the caruncle

- Superior and inferior wound closures which are outside the interpalpebral fissure. A graft that is fixed tightly to the sclera with no intervening tissue except for the medial rectus and its fascia is achieved by suturing firmly to the sclera in all areas except nasally.
- Recessing the graft back from the limbus for 1 to 2 mm

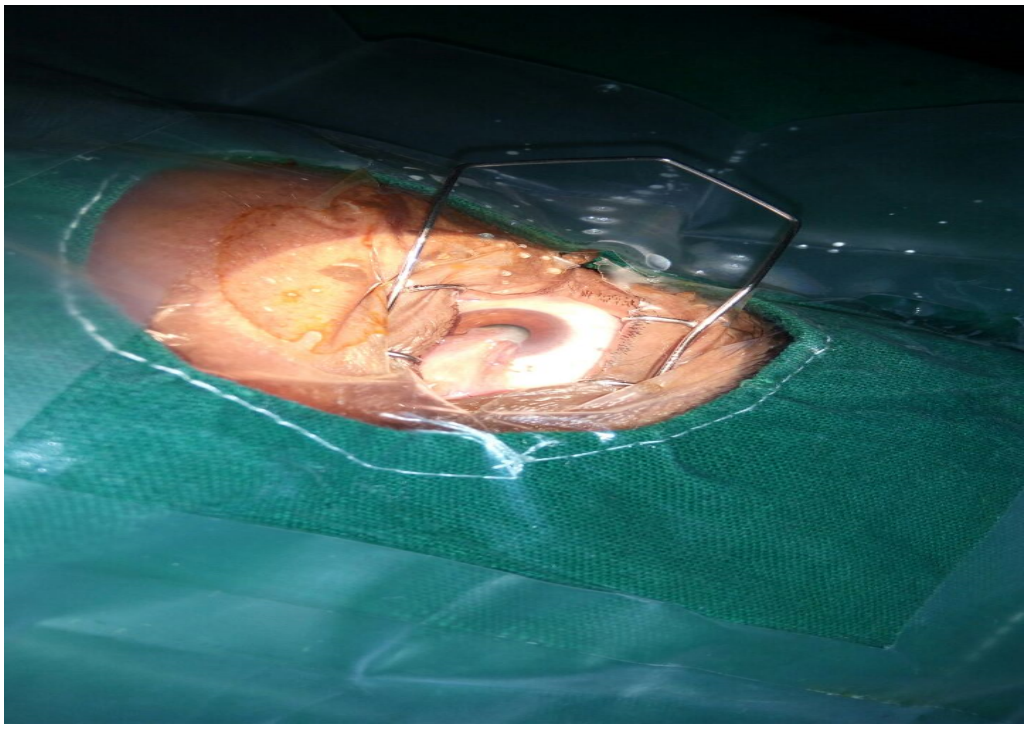
The features of the surgery that lead to reduced scarring at the donor site are:

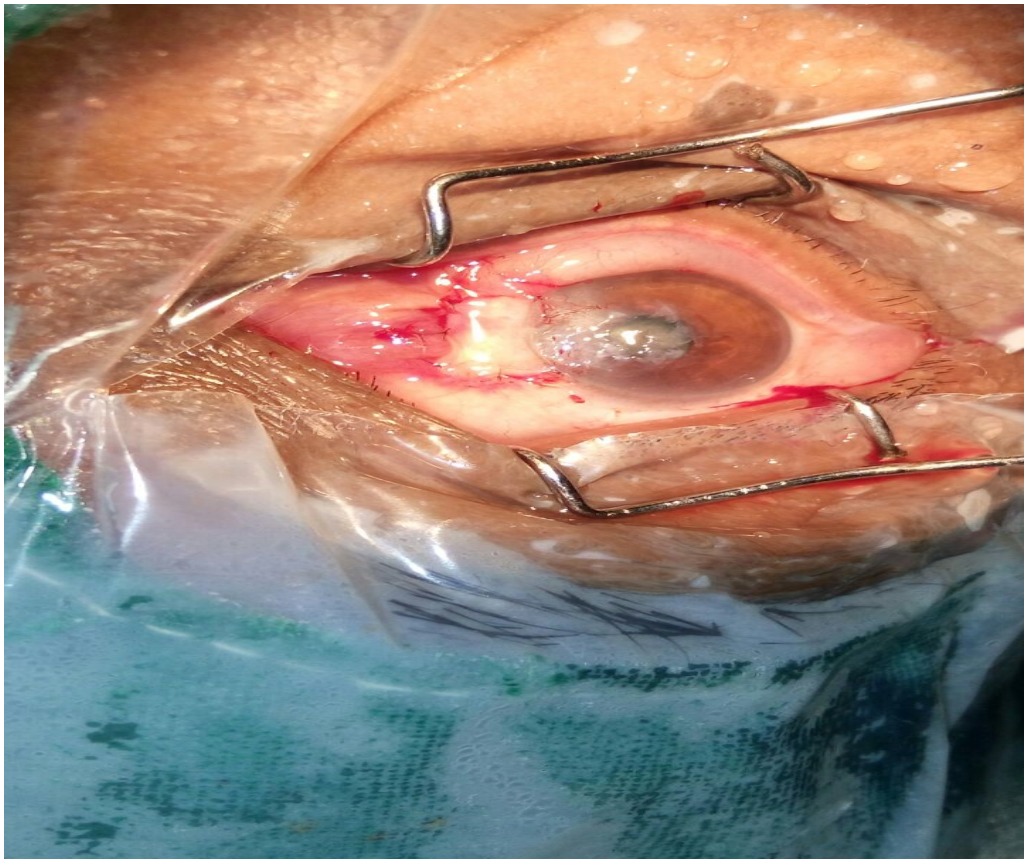
- Immaculate maintenance of the underlying Tenon's capsule
- A superior incision close to the superior fornix
- Leaving a fringe of 1 to 2 mm of limbal conjunctiva, when excising the graft near the limbus
- Intensive postoperative topical corticosteroids

PROCEDURE:

EXTENDED PTEYGIUM REMOVAL:

Since this procedure is time consuming a good peribulbar or retrobulbar block should be given.





- A broad ink mark is made across the pterygium slightly posterior to the limbus, then transect the pterygium, including the conjunctiva and underlying Tenon's fascia. Strip the head of the pterygium from the corneal surface and remove all involved Bowman's membrane.

- A sharp dissection of the conjunctiva from Tenon's fascia in a trapezoidal area is done approximately 10-12 mm wide at the limbus to 15 mm posteriorly, extending almost to the nasal edge of the superior and inferior recti and dissect a similar area between Tenon's and the sclera.

- Isolate the medial rectus muscle and excise the dissected Tenon's, taking care to retain the medial rectus fascia and avoid injury to the muscle by holding the muscle to the side with a muscle hook.

- The incision is extended posteriorly, gently prolapse the freed Tenon's fascia until observing orbital fat in the operative field. Similar dissection is done superiorly. Due to this dissection, the free conjunctival edge, originally adjacent to the limbus, retracts without any conjunctival excision, leaving a bare area larger than 8×10 mm.

- Secure the medial rectus with a 4-0 silk suture passed under the muscle and the lateral rectus is secured with a suture passed through the conjunctiva and the resultant trapezoidal conjunctival defect now measures approximately 8 mm at the limbus, 15 mm from the limbus to

the paracaruncular edge, and 12 mm from the superior to the inferior edge, measured halfway between the limbus and the paracaruncular edge.

- The limbus and corneal bed is smoothed with a rotary diamond burr.

HARVESTING THE GRAFT:

- The superior bulbar conjunctival graft is next harvested. Eye is rotated inferiorly by 2 rectus muscle sutures. The area of the graft is marked with ink, making 2 radial lines from the limbus to the superior fornix, separated 6 to 8 mm near the limbus and 15 mm at the fornix. The medial line should be at least 3 to 5 mm from the superior edge of the exposed nasal defect.

- Using a 30-gauge needle, inject balanced salt solution just under the conjunctiva, temporal to the radial mark, move it nasally to raise the superior bulbar conjunctiva within the marked area. Incise the radial marks through conjunctiva with scissors, leaving the underlying Tenon's fascia intact. Sharply dissect the edges free of the underlying Tenon's fascia, leaving 1.5 to 2 mm of limbal conjunctiva to prevent limbal stem cell deficit.

EXTENDED CONJUNCTIVAL AUTOGRAFT:

- Transfer the graft to the recipient bed, with temporal rotation of

the eye during graft fixation. Suture the limbal corners of the graft to the sclera and the edges of the recipient conjunctiva using 9-0 Vicryl suture and leave 1 to 2 mm of bare sclera adjacent to the limbus.

- Unfolding of the graft is done to identify the posterior corners. At points 1 to 2 mm from its posterior corners, suture the graft very superficially to the sclera and recipient conjunctiva 13 to15 mm from the limbus, stretching it over the medial rectus muscle.

- Suture the superior and inferior edges of the graft to the sclera and the recipient conjunctiva, using 3 interrupted sutures placed between the corner sutures and maintain the tension on the graft. Use a continuous 9-0 Vicryl suture to oppose the medial edge of the graft to the paracaruncular conjunctiva for constructing the semilunar fold. The final scar is hidden in the fold of conjunctiva.

- For recurrent pterygium, the surgical technique is the same as for primary pterygium, except that it is more difficult and takes longer time

Lid swelling and limitation of adduction will be there on the first postoperative day. The limitation of movements usually resolves within 3 to 7 days in primary cases, but may take up to 2 to 3 weeks in recurrent cases.For 3 weeks, intensive topical corticosteroids are administered every 2 hours, and then

reduced to 4 times a day for a further 6 weeks. Antibiotic drops are used for 1 week.

By 2 weeks, the epithelium is usually healed in all areas, with the corneal and scleral defect healing from the corneal epithelium, and *not* the conjunctival epithelium. The area of nasal sclera not covered by the recessed conjunctival graft is the last to heal. For the first 1 to 3 weeks, there is considerable edema of the graft and by 1 month, the eye is usually quiet with an integrated graft. Sometimes minimal swelling persists at the reconstructed semilunar fold for few weeks. By 4 months it is usually impossible to tell where the graft has been placed and the cosmetic appearance is excellent.

The last area to revert to normal is the superior bulbar conjunctiva. Some traction and scarring may persist for up to 6 months.

RISKS AFTER SURGERY:

1 in 400 chance of cyst or infection which could require further surgery

1 in 500 chance of persistent double vision requiring surgery on the muscle

1 in 500 chance of the graft tissue which does not settle ie remaining red and inflamed and has to be replaced

1 in 1000 chance of a drooping eyelid requiring further surgery

LIMBAL AND LIMBAL CONJUNCTIVAL TRANSPLANTATION:

A recent etiopathogenesis that is formulated in the formation of pterygium is Limbal stem cell anomalies. Hence on using the Limbal tissue containing stem cells it may hinder the migration of the conjunctival cells over the cornea and helps in the prevention of recurrence of the disease. The recurrence rate is 0 – 15%

STEPS:

1. About 0.5 mm from limbus a circular incision is made of 100 to 150 micrometer depth on the cornea.

2. Usual size of graft not exceeding 6 mm.

3. Along with the conjunctival graft 0.5 mm of peripheral cornea to be included.

4. Conjunctival side should be sutured with 10/0 absorbable material

5. The corneal side to be sutured with 10/0 nylon interrupted sutures.

ADJUNCTIVE THERAPY:

In view of the above major side effect following a bare sclera technique many adjuvant therapies were tried.

RADIATION THERAPY:

In the beginning variable amounts of irradiation which was not standardised properly was used with Grenz rays, radon bulbs, x-rays, radium plaques. Later beta irradiation was found to be most effective and safest method of radiation. It causes radiation induced ionisation changes in the cells involving its nucleus and cytoplasm.

REGIMEN:

The standard protocol followed is Sr90 brachytherapy with an epibulbar plaque. The dose delivered is in the range of 5 – 20 Gy/min. Total dose delivered will be in the range of 25 – 60 Gy in a 1 – 6 fraction. Antibiotics should be given post radiation together with corticosteroids.

CHEMOTHERAPY:

THIOTEPA:

It is a nitrogen mustard group of drug, chemically it is triethylene thiophosphoramide which is radiomimetic, alkylating drug. It hinders with the rapidly proliferating tissue's mitotic phase. This action is brought about by the release of ethylenimine radicals which exerts their action on the actively dividing cells. Its topical use prevents the capillary endothelial proliferation and there by pterygium.Thiotepa is commonly used in a dilution of 1:2000 or

1:5000. Following a bare sclera excision of pterygium the drug is administered topically every 3 hours for the next 6 to 8 weeks.

Complications are poliosis, peribulbar skin depigmentation, sclera ulcer and chronic conjunctivitis.

MITOMYCIN C:

_ Mitomycin C is isolated from the Streptomyces caespitosus by fermentation. It is basically an anti biotic which also has anti neoplastic and anti metabolite property. Mitomycin C inhibits the DNA replication selectively and adds to the cellular RNA synthesis inhibition and protein synthesis. The fibroblasts normally produces collagen which is inhibited by Mitomycin C thus helping in prevention of pterygium recurrence.

Kunimoto and Mori of Japan were the first to describe the usage of Mitomycin C in pterygium surgery. Like glaucoma filtering surgery in pterygium surgery it helps in decreasing the fibro vascular regrowth and scarring by inhibiting the episcleral fibroblast growth. Hence it is a bio reductive alkylating agent.

PREPARATION OF MITOMYCIN C:

Mitomycin C is available in market as a purple coloured powder. It is a 2 mg or 10 mg vial. It should be freshly reconstituted with either distilled water or normal saline to attain a concentration of 0.2 – 0.5 mg / ml by adding 10 ml of distilled water to the 2 mg vial with a concentration of 0.2 mg / ml.

METHODS OF APPLICATION:

There are three methods of application. They are

1) Preoperative intra lesional injection

2) Intraoperative application

3) Postoperative topical application

Of all these methods the currently used methods are intraoperative and postoperative application.

COMPLICATIONS:

1) corneal thinning / punctate keratitis

2) SCLERAL melting / perforation

3) Scleral necrosis / scleritis

4) Endophthalmitis

5) pain

ADVANTAGE:

Better than radiation therapy

Results were comparable with conjunctival autografting

Safer method

COMPLICATIONS:

1) Wound dehiscence

2) corneal edema

3) corneal ulceration / perforation

4) Secondary glaucoma

5) Iritis

6) Scleral ulceration / necrotising scleritis

7) scleral calcification

8) pain / sudden onset mature cataract

CONTRAINDICATION:

1) Dry eye

2) Atopic kerato conjunctivitis

3) Herpes keratitis

5- FLUROURACIL:

Anti fibrotic agent, which inhibits DNA synthesis. There are only few studies related to this drug, all employed intraoperative 5- flurouracilof 10 mg/ml for 5 min.

0.05% CYCLSPORINE (CsA):

It is a lipophilic cyclic polypeptide composed of 11amino acids. It is extracted from fungus—Tolypocladium inflatum in Norway. It is most effective in preventing acute rejection of transplanted organs.

Cyclosporine has a molecular formula of $C_{62}H_{111}N_{11}O_{12}$ and molecular weight of 1202.6 g/mol. It is a non-ribosomal peptide that contains one d-amino acid. The structure of the molecule is very rigid because of the hydrogen bonding with the cyclic structure having a low water solubility with variable cellular absorption.[26] Cyclosporines belong to the group of compounds known as calcineurin inhibitors.

Cyclosporine 0.05% for topical use was approved by FDA in December 2002.

MECHANISM OF ACTION:

It acts as a selective T cell immunosuppresor. T cells are lymphocytes that allow the immune system to protect against the viral infections. They help in antibody production and also assist other cells in anti-tumor activity.

It being a powerful immunomodulator, inhibits the T lymphocytes from producing toxic mediators.

Mechanism of action of cyclosporine in pterygium prevention:

- It shows a selective effect against T-helper cells and prevents the synthesis and secretion of both inflammatory cytokines and mediators
- It also blocks the angiogenesis factor induced by VEGF in pterygium formation
- Inhibit the proliferation in Tenon's capsule fibroblasts

Cyclosporine can be delivered to the eye in aqueous drop form, but the low solubility of cyclosporine in water limits its penetration in eyes. Penetration enhancers such as cyclodextrins have also been used to increase corneal penetration of cyclosporine. Emulsions provide effective topical ophthalmic drug delivery systems with a potential for sustained drug release.[21] The currently approved drug has 0.05% oil in water emulsion.

ADVERSE EFFECTS:

- Eye redness
- Discharge
- Eye pain
- Watery eyes
- Itching
- Foreign body sensation
- Blurred vision

- Stinging sensation
- Persistent corneal epithelial defect
- Scleral melting
- Drop intolerance

CONTRAINDICATIONS:

- Patients with hypersensitivy reaction
- Ocular surface infections
- Pregnancy

CsA 0.05% eyedrops administered postoperatively at 6 hour interval for 6 months after pterygium surgery prevents recurrence of pterygium.

One study including 36 patients with bare sclera and postoperative cyclosporine showed 22.2% recurrence compared to bare sclera technique alone, which has a recurrence rate of 44.4%..

Another study with conjunctival rotation flap technique done in 56 patients and cyclosporine instilled in 26 patients showed a recurrence rate of 7.7% compared to 20% in control group.

TISSUE ADHESIVES:

Refojo et al and Webster et al were the first to report the usage of tissue adhesives in ocular surgery as a part of management of corneal perforations. All tissue adhesives available are considered as off – label application.

ADVANTAGES:

- Easy availability
- Easier and faster application
- Cost effective
- Decrease the operating time
- Decreases pain and the surgical risk

TYPES OF TISSUE ADHESIVES:

1. Cyanoacrylates

2. Fibrin, Marine glue etc.

CYANOACRYLATE:

They are rapid polymerizing compound. They tend to polymerise as soon as it comes in contact with some fluids such as water, blood. During the process of polymerisation bonding to the tissues to which it is applied occurs.

Two methods are used in the application of adhesive 1. Drop method 2. Disk method

HUMAN FIBRIN ADHESIVE: Human fibrin adhesive stays in vivo for less than 2 weeks. The advantages are no suture is required with low recurrence rate. The disadvantage of this technique is high cost, graft displacement, risk of transmission of infections.

REVIEW OF LITERATURE

A prospective study of PERFECT surgery done on 111 consecutive patients with recurrent pterygium removal conducted and followed up for a period of one year, showed no recurrence rate with minimal complications like corneal ulcer in one patient, one patient with exotropia who required no treatment, concluding that this procedure resulted in zero recurrence with minimal complications and good cosmesis.

Another prospective study done on 1000 patients resulted in 0.1% recurrence rate with minimal complications.

A prospective study conducted in 36 patients with postoperative topical 0.05% cyclosporine after bare sclera technique and followed up for one year, showed a recurrence rate of 22% compared to that of 44% with bare sclera technique alone.

A case control study done on postoperative topical cyclosporine A in the prevention of pterygium recurrence, in which the pterygium is recurred in 4 of 31 eyes in treatment group and 14 of 31 eyes in the control group. The control group had a 7.37 times higher risk of recurrence compared with the treatment group in one year follow up.

AIMS AND OBJECTIVES:

- To study the efficacy of conjunctival autograft after extended pterygium excision in primary fleshy pterygium
- To determine the recurrence rate after surgery with and without cyclosporine in preventing recurrence.

STUDY DESIGN:

Prospective, observational, case control study

STUDY PERIOD:

6-9 months

SAMPLE SIZE:

60 patients

ETHICAL CLEARANCE:

Approval letter obtained

FINANCIAL INTEREST:

NIL

MATERIALS AND METHOD:

This study was conducted among 60 patients with primary fleshy pterygium, who satisfy the inclusion criteria attending the OPD as well as in the wards at Govt Rajaji Hospital Madurai after obtaining consent.

Extended pterygium removal with conjunctival autograft was done in all 60 patients. Among the 60 patients, 30 patients were allocated as group I who receive postoperative cyclosporine eye drops and 30 patients were allocated as group II who will not receive cyclosporine eye drops and the results were studied for recurrence and complications.

INCLUSION CRITERIA:

- Patients with primary fleshy pterygium 30 -60 years age group, both sexes
- Patients with diminished vision due to astigmatism or encroachment on pupillary area.
- Patients with progressive nasal pterygium.
- Patients with pterygium causing cosmetic disfigurement.
- Patients with pterygium causing persistent discomfort.
- Patients with pterygium causing restricted ocular mobility

EXCLUSION CRITERIA:

- Patients with ocular surface diseases, dry eyes, autoimmune diseases
- Patients with atrophic and intermediate pterygium
- Patients with H/O traumsa
- Patients with secondary pterygium due to chemical burns
- Patients with pseudopterygium, recurrent pterygium and temporal pterygium
- Patients with glaucoma
- Patients allergic to cyclosporine
- Pregnant mothers
- Post ocular surgeries

PREOPERATIVE ASSESMENT:

OCULAR EXAMINATION:

Uncorrected and best corrected visual acuity was recorded for all 6 patients.

Keratometry values were recorded.

Slit lamp examination was done and the pterygium was graded by Tan's grading. Grade III pterygium was included in the study. Cornea, tear film, anterior segment, adnexa were examined.

Dilated fundus examination was done

Nasolacrimal duct patency was done

Baseline IOP of both eyes were recorded

SYSTEMIC EXAMINATION:

Pulse rate, blood pressure, random blood sugar, haemoglobin, bleeding time and clotting time were done.

SURGICAL TECHNIQUE:

All patients were operated by a single surgeon under peribulbar anesthesia.

- An ink mark is across the ptrygium and is transected including the conjunctiva and Tenon's fascia. The pterygium is then stripped from the corneal surface along with the involved Bowman'smembrane. After Conjunctival and Tenon's fascia dissection a trapezoidal area is created approximately 10-12 mm wide at the limbus to 15 mm posteriorly

- Dissect a similar area between Tenon's and the sclera.Isolate the medial rectus muscle and excise the dissected Tenon's, taking care to retain the medial rectus fascia and avoid injury to the muscle by holding the muscle to the side with a muscle hook.

- Secure the medial rectus with a 4-0 silk suture passed under the muscle and the resultant trapezoidal conjunctival defectwhich was approximately 8 mm at the limbus, 15 mm from the limbus to the paracaruncular edge, and 12

mm from the superior to the inferior edge.The limbus and corneal bed was smoothed with a rotary diamond burr.

- The superior bulbar conjunctival graft was harvested by marking the area of the graft with ink, and 2 radial lines were drawn from the limbus to the superior fornix, which was separated 6 to 8 mm near the limbus and 15 mm at the fornix. The medial line should be at least 3 to 5 mm from the superior edge of the exposed nasal defect.

- Using a 30-gauge needle, balanced salt solution was injected under the conjunctiva and then the conjunctiva was incised with scissors through the marks, leaving the underlying Tenon's fascia intact. A 1.5 to 2 mm of limbal conjunctiva was left behind to prevent limbal stem cell deficit. The graft was then transferred to the recipient bed and the limbal corners of the graft were sutured to the sclera and the edges to the recipient conjunctiva using 9-0 vicryl suture. About 1 to 2 mm of bare sclera was left behind adjacent to the limbus.The medial edge of the graft was sutured to the paracaruncular conjunctiva and a semilunar fold was constructed with 9-0 vicryl suture for excellent cosmesis.

- Tight pad and bandage was applied for next 24 hours. Potent analgecics were given. All patients were given antibiotic eye drops for one week.

Steroid eye drops were given every 2 hourly for first 3 weeks and was tapered for next 4 weeks.

- Topical 0.5% cyclosporine eye drops were instilled every 6 hourly for 6 months in group I patients and group II patients received a placebo(lubricant eye drops).

ASSESSMENT OF PARAMETERS:

- Postoperative care was given according to patients symptoms, slit lamp examination was done to access graft edema, necrosis, haemorrhge, retraction.

  Slit lamp grading of graft stability:

  Grade O - well opposed

  Grade 1 - displaced at one side of the graft bed junction

  Grade 2 - two sides of margins displaced and not apposed

  Grade 3 - three sides of margins not apposed, graft displaced

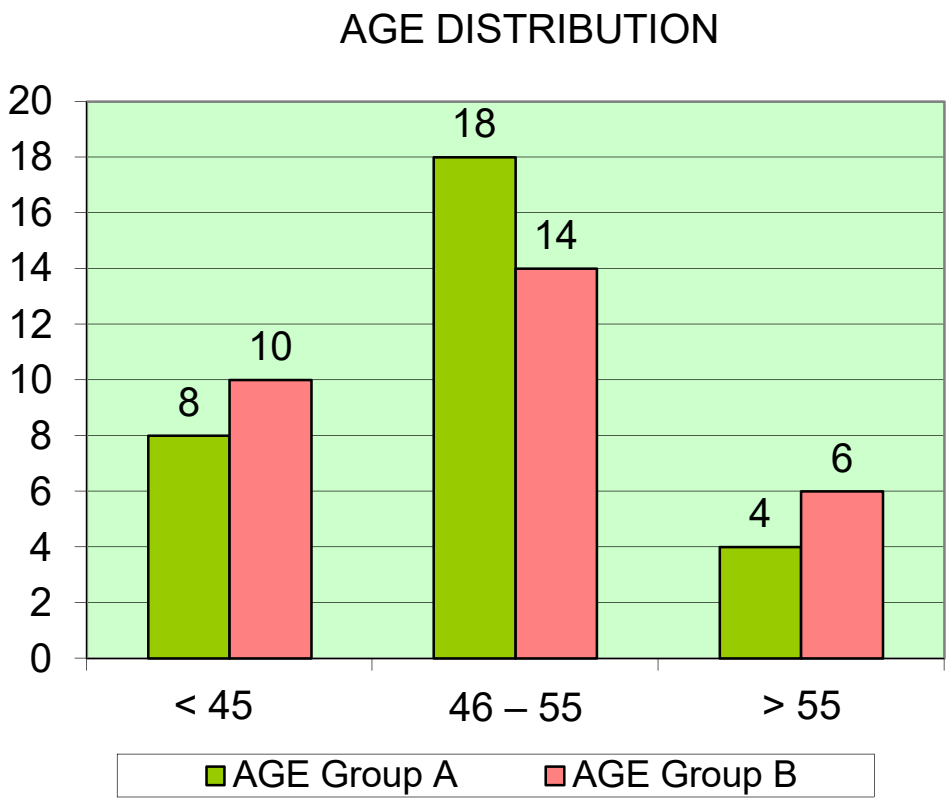
  Grade 4 - completely displaced graft with lack of apposition

All the eyes which underwent surgery were analyzed for post operative correction of astigmatism by K - reading. All patients were followed for the next six months on post op day 1, 7, 30, 90, 180 for best corrected visual acuity, recurrence, complications and drug induced toxicity. IOP measuring was done.

RESULTS AND INTERPRETATION

AGE DISTRIBUTION:

AGE		
	Group I	Group II
≤ 45	8	9
46 – 55	14	12
> 55	8	9
Total	30	30

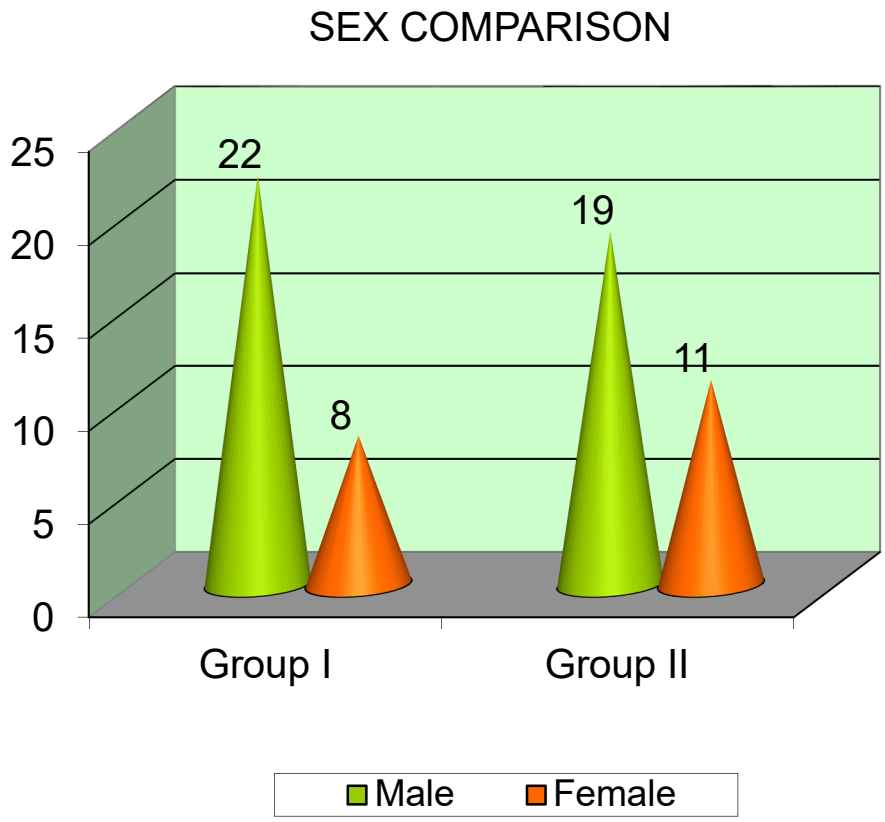


Of the 30 patients in group I, 8 (26.6%) patients were <45 years old, 14(46.6%) were 46-55 years old, 8(26.6%) were >55 year old

In group II, 9(30%) were <45 year old, 12(40%) were 46-55 year old, 9(30%) were > 55 year old. Majority of the subjects taken for study in both groups were between 46 and 55 years and less numbers were below 45 years and above 55 years.

SEX DISTRIBUTION:

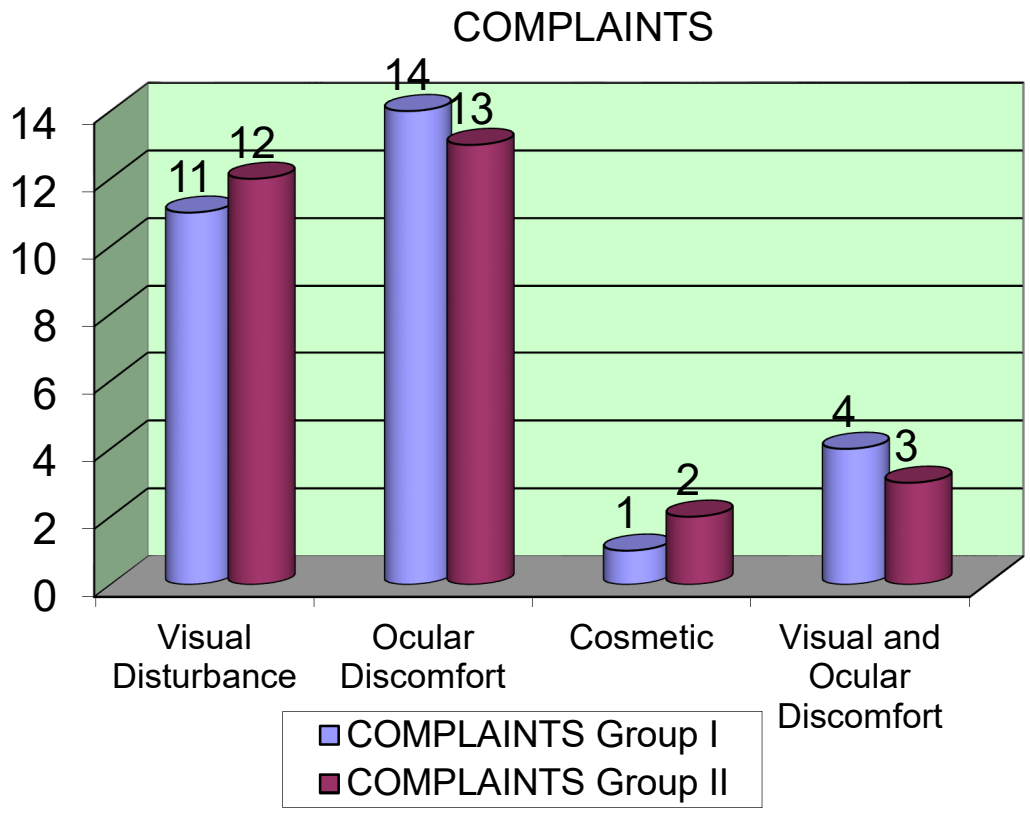
SEX		
	Group I	Group II
Male	22	19
Female	8	11
Total	30	30



In group I patients, 22(73.3%) were males and 8(26.6%) were females. In group II patients, 19(63.3%) were males and 11(36.6%) were females. The study showed male preponderance in pterygium formation associated with outdoor activity.

COMPLAINTS:

COMPLAINTS		
	Group I	Group II
Visual Disturbance	11	12
Ocular Discomfort	14	13
Cosmetic	1	2
Visual and Ocular Discomfort	4	3
Total	30	30

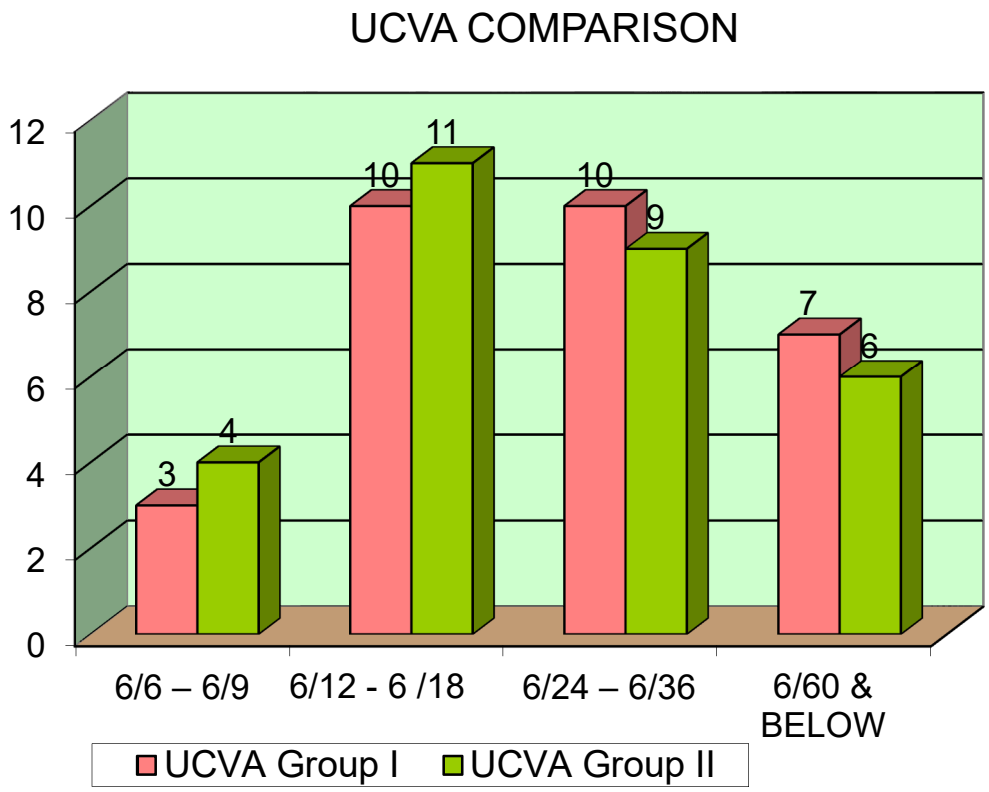


Among 30 patients in group I, 11(36.6%) cases were presented with visual disturbance. 14 (46.6%) cases presented with symptoms of ocular discomfort. 1(3.3%) presented for cosmetic correction and 4(13.3%) for both visual and ocular discomfort. Among 30 patients in group II, 12(40%) cases were presented with

visual disturbance, 13(43%) were presented for ocular discomfort, 2(6%) for cosmetic correction and 3(10%) for both ocular and visual discomfort. Patients in both groups were presented mainly for ocular discomfort and visual disturbance.

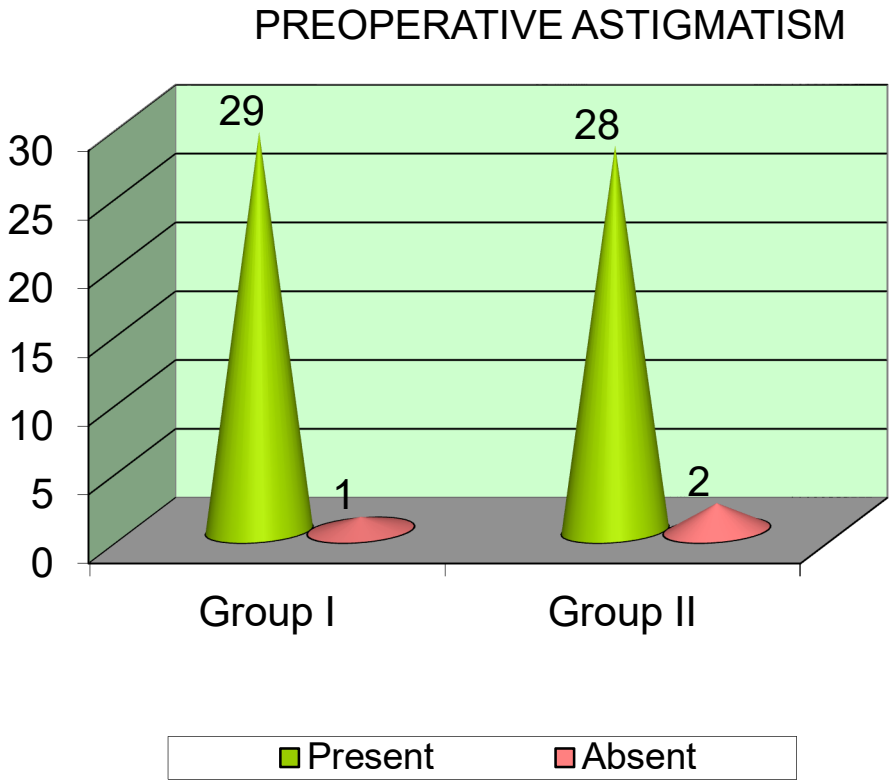
PREOPERATIVE UNCORRECTED VISUAL ACUITY:

UCVA		
	Group I	Group II
6/6 – 6/9	3	4
6/12 - 6 /18	10	11
6/24 – 6/36	10	9
6/60 & BELOW	7	6
Total	30	30



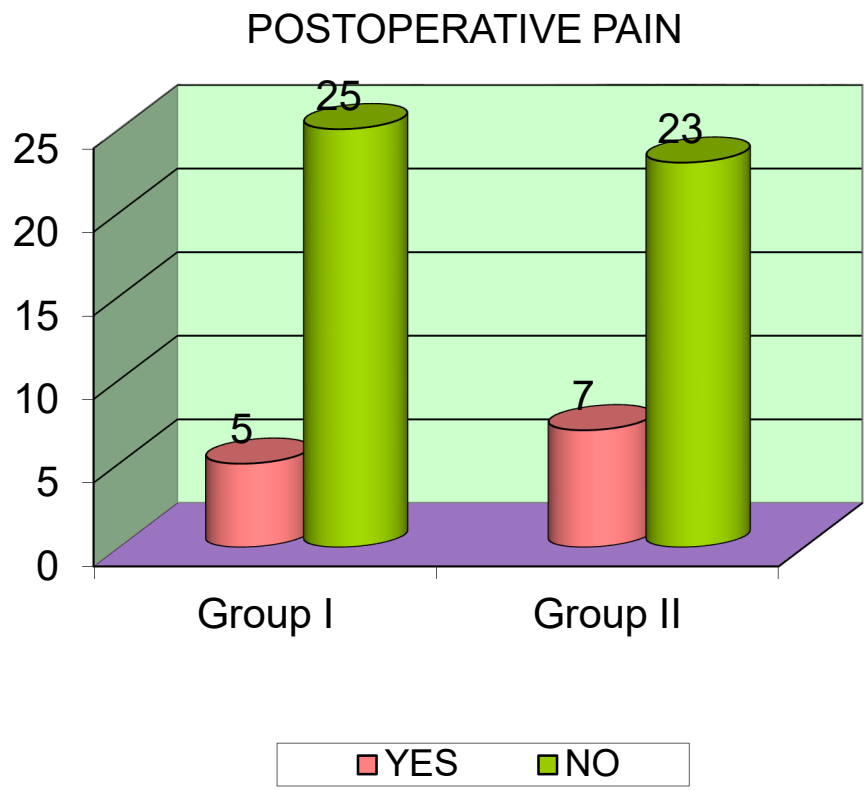
PREOPERATIVE ASTIGMATISM:

PREOPERATIVE ASTIGMATISM	Group I	Group II
Present	29	28
Absent	1	2
Total	30	30



POST OPERATIVE PAIN:

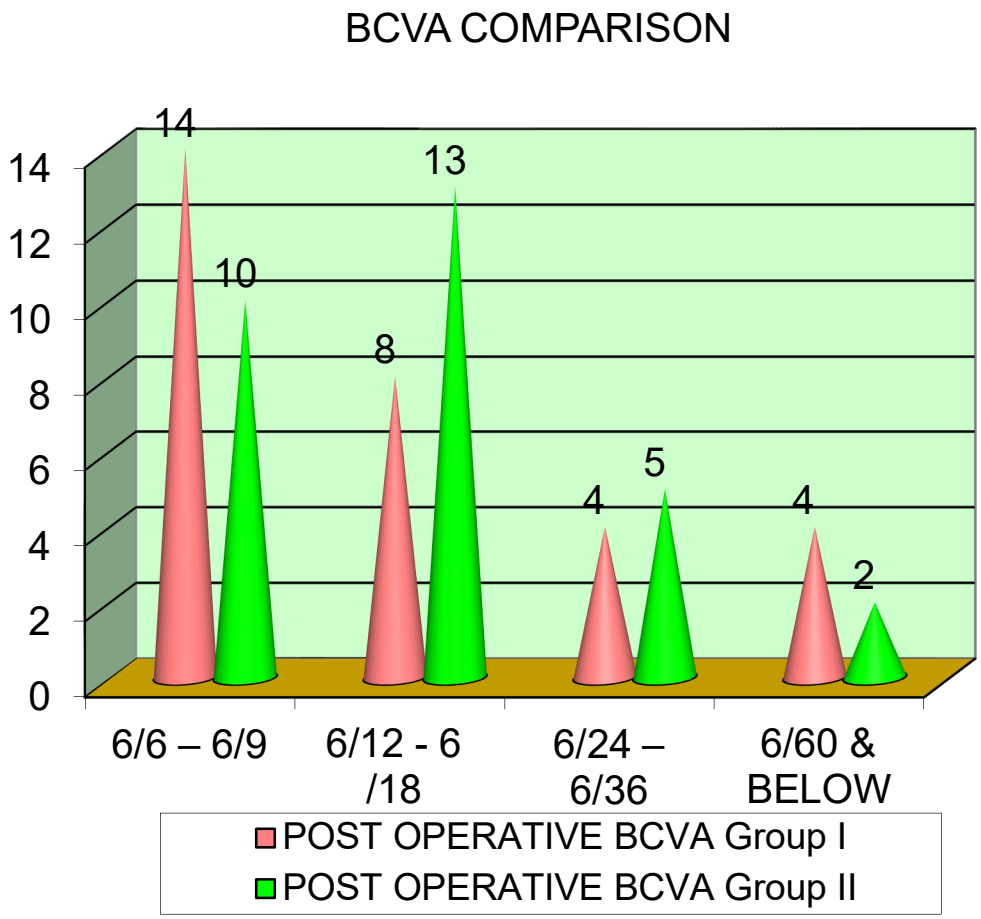
POST OPERATIVE PAIN		
	Group I	Group II
YES	5	7
NO	25	23
Total	30	30



A scoring was done to assess the pain response of the patients post operatively. Each patient was assessed for pain on post op day 1 and day 7. About 12(5+7)20% of the patients experience pain in both the groups.

POST OPERATIVE BEST CORRECTED VISUAL ACUITY:

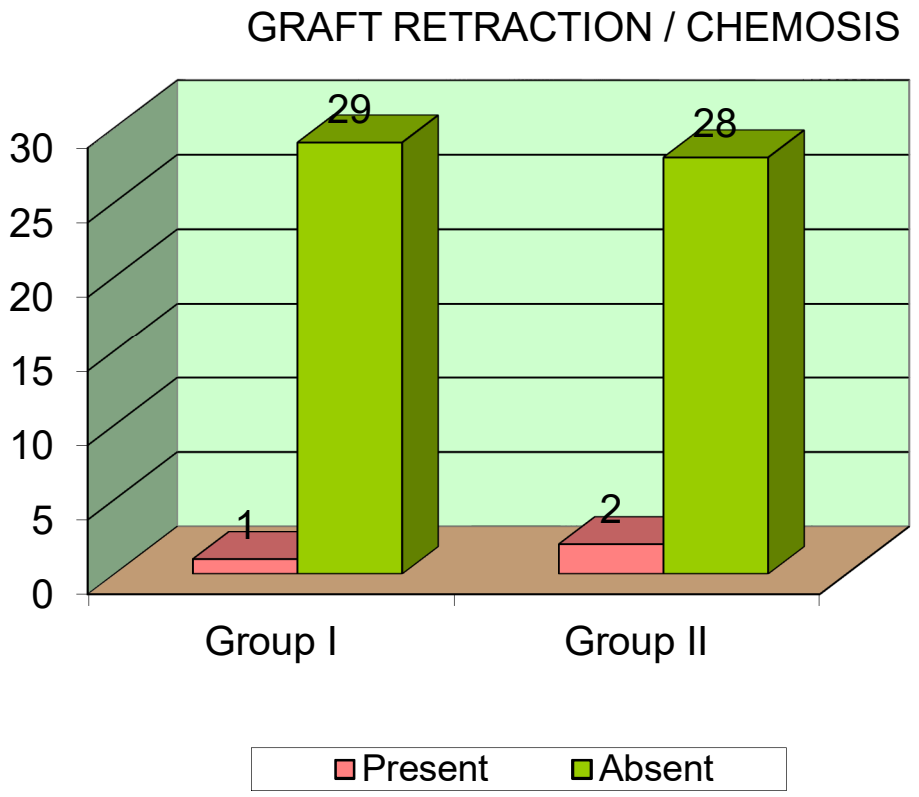
POST OPERATIVE BCVA		
	Group I	Group II
6/6 – 6/9p	14	10
6/12 - 6 /18p	8	13
6/24 – 6/36	4	5
6/60 &below	4	2
Total	30	30



Improvement in 1- 2 lines were noted postoperatively, by Snellen's chart in both the groups, compared to the pre op uncorrected visual acuity.

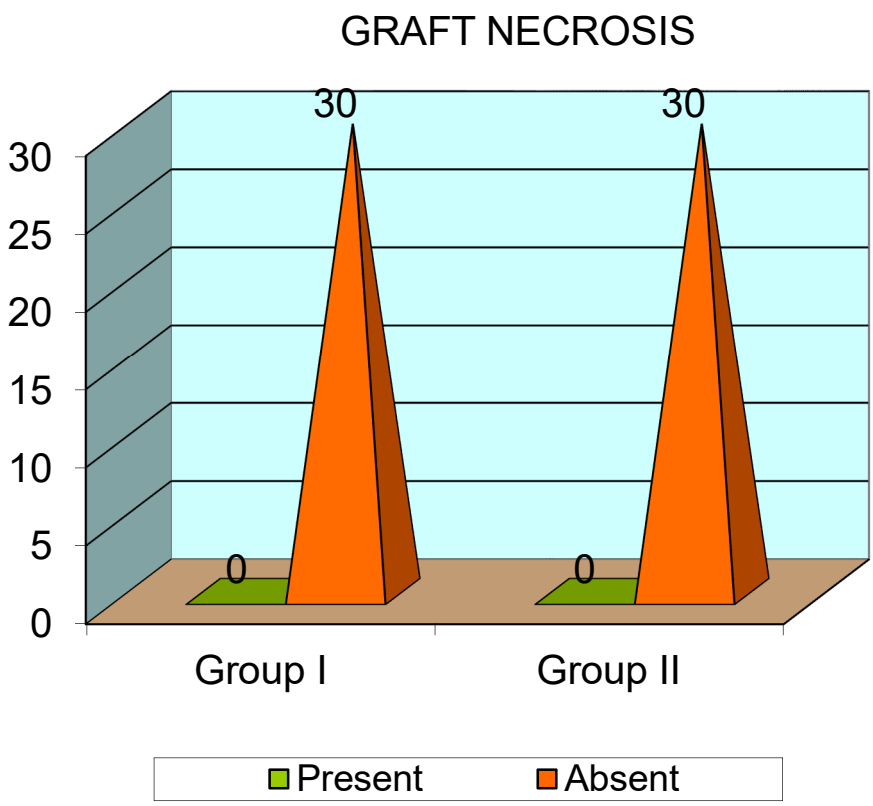
GRAFT RETRACTION/ GRAFT CHEMOSIS:

GRAFT RETRACTION / CHEMOSIS	Group I	Group II
Present	1	2
Absent	29	28
Total	30	30



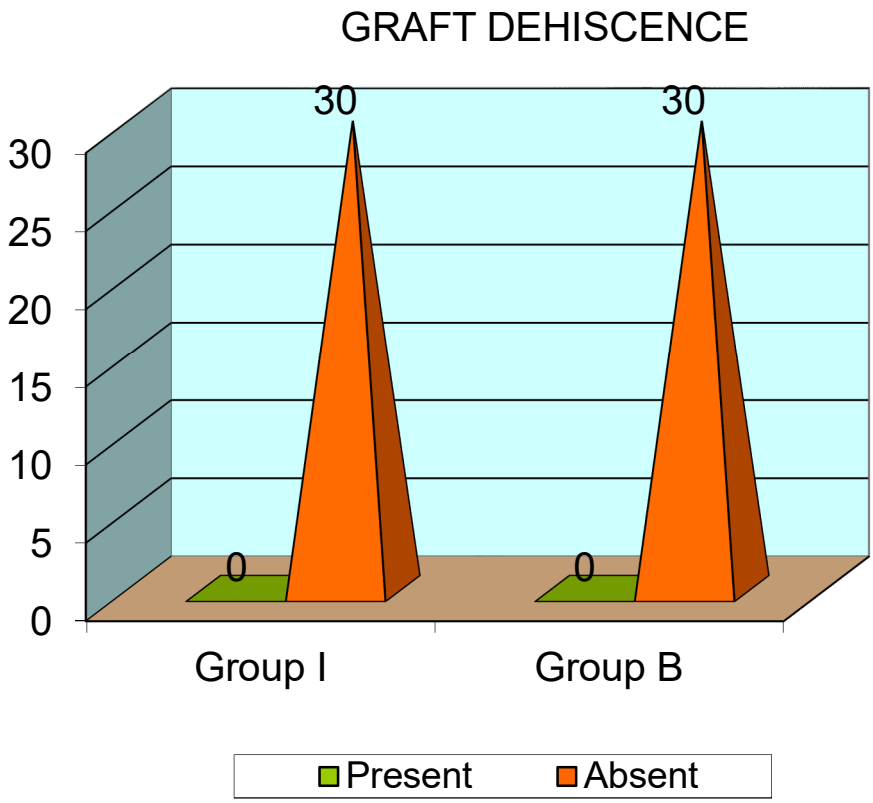
GRAFT NECROSIS:

GRAFT NECROSIS		
	Group I	Group II
Yes	0	0
No	30	30
Total	30	30



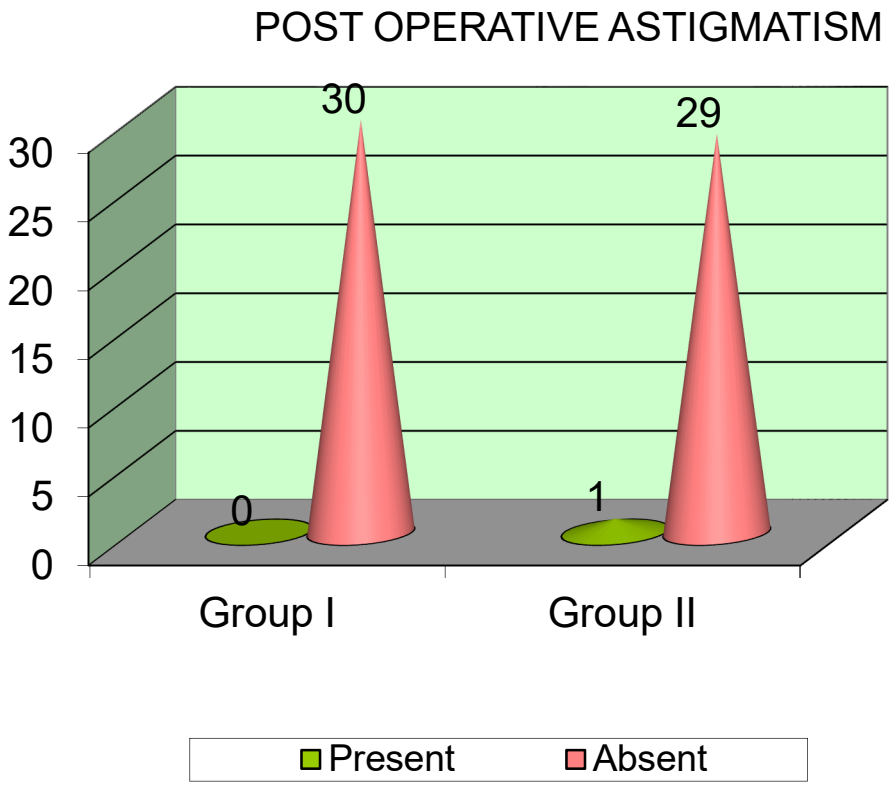
GRAFT DEHISCENCE:

GRAFT DEHICENCE	Graft I	Group II
PRESENT	0	0
ABSENT	30	30
Total	30	30



POST OPERATIVE ASTIGMATISM:

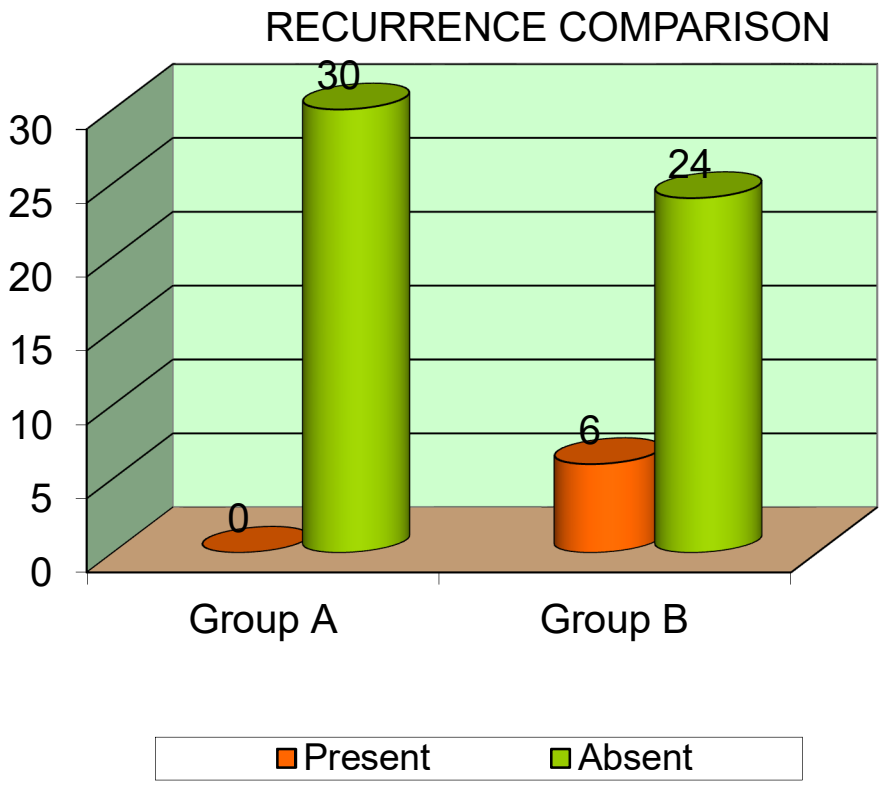
POSTOPERATIVE ASTIGMATISM		
	Group I	Group II
Present	0	1
Absent	30	29
Total	30	30



Only 1(33.3%) patient in group II had postoperative astigmatism on day 30 which was not significant.

RECURRENCE:

RECURRENCE		
	Group I	Group II
Present	0	6
Absent	30	24
Total	30	30
P value	0.024 Significant	



There was no recurrence noted in group I patients with postoperative cyclosporine, but in group II, 6(20%) patients had recurrence, which was found to be statistically significant with p value of 0.024

SUMMARY

The study was a prospective, observational study to compare the outcome of conjunctival autograft following extended conjunctival removal with and without postoperative cyclosporine in primary fleshy pterygium. All the patients included in inclusion criteria were selected and underwent surgery. Group I patients were given topical 0.05% cyclosporine eye drops and group II patients received the placebo. The patients were followed on day 1, 7, 30, 90 and 180 days.

AGE DISTRIBUTION:

32(43.3%) patients in both groups were in the age group of 46-55 years which correlate with the literature and concludes the increase with advanced age.

SEX DISTRIBUTION:

41 patients from both the groups were males and which correlate well with the increase in pterygium prevalence in those who work outdoors.

COMPLAINTS:

1(3.3%) patient in group I and 2(6%) in group II came for cosmetic correction and other patients for ocular discomfort and visual disturbance.

PREOPERATIVE ASTIGMATISM:

95% patients in both the groups were found to have preoperative astigmatism owing to the grade III fleshy pterygium.

GRAFT NECROSIS:

No graft necrosis was noted in both the groups.

GRAFT DEHISCENCE:

No graft dehiscence was noted in both the groups.

GRAFT RETRACTION:

3.3% patients in group I and 6.6% in group II undergo graft retraction which was not significant.

POST OPERATIVE ASTIGMATISM:

Only 1(3.3%) patient in group II had postoperative astigmatism .

BEST CORRECTED VISUAL ACUITY:

90% patients had improvement in the postoperative visual acuity with 1-2 lines in Snellen's chart.

RECURRENCE:

There was a recurrence rate of 20% in group II patients compared to group I patients with zero recurrence rate which was statistically significant and it proved the safety and efficacy of cyclosporine in preventing postoperative complications and recurrence after pterygium surgery.

DISCUSSION

A number of surgical procedures are available and are recommended like excision of pterygium with adjunctives, amniotic membrane transplantation, rotational auto graft, conjunctival autograft etc.

The goals to be achieved by any approach for pterygium are,

1) No complications due to surgery

2) A low recurrence rate

3) Good cosmesis

4) Cost benefit

The important benefit of conjunctival auto graft is preservation and restoration of the anatomy of conjunctiva and its interface with cornea in a more physiological pattern. That is why conjunctival auto graft is superior to all the available treatment techniques and most widely accepted. The modification of conjunctival autograft in which an extended area of pterygium was excised and replaced by an extended conjunctival autograft which results in very minimum recurrence and increased cosmesis. Although it was a good and safe procedure it has certain short comings like increased time duration of surgery, rectus muscle involvement, need for large sized autograft. No patients in either group developed graft necrosis, graft dehiscence, sclera thinning and corneal involvement.

Postoperative 0.05% cyclosporine eye drops reduce the recurrence to the least. In our study it is clear that there is no significant side effects associated with topical cyclosporine compared to the other group. And there is no recurrence in patients on cyclosporine which proved it as an efficient and safe drug for postoperative use.

The mean recurrence in all patients after pterygium excision has occurred around 3 months.

The efficacy of this procedure was studied with the already done conjunctival flap rotation technique with postoperative cyclosporine in 26 patients of treatment group which resulted in 7.7% recurrence(2 patients) in treatment group and 20% in control group on retrospective basis. Another study of bare sclera technique with post operative cyclosporine done in 18 patients, resulted in recurrence of 22.2%(4 patients) compared to 44.4% in control group. The p value in our study is 0.024 which is < 0.05 shows that there is statistical difference between the group I(cyclosporine group) and group II(placebo group) which is significant and proves that extended conjunctival autograft followed by extended pterygium removal with post operative topical cyclosporine is superior to other techniques.

The corneal curvature and the measured cylinders before and after surgery showed significant statistical changes and bought an improvement in the visual acuity because of a decrease in cylinders.

CONCLUSION

The study to compare the efficacy of conjunctival autograft followed by extended pterygium removal with post operative topical cyclosporine shows significant results in visual acuity improvement, with least complications and low recurrence.

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PROFORMA

Case no: IP no:

Name: Group I/ Group II

Age / Sex:

Occupation:

Complaints: Grade III pterygium

Past history:

OCULAR EXAMINATION:

RIGHT EYE		LEFT EYE
	LIDS	
	CONJUNCTIVA	
	CORNEA	
	ACD	
	IRIS	
	PUPIL	
	LENS	

	PREOPERATIVE	POSTOPERATIVE
IOP		
K READING		
VISUAL ACUITY		

POST OPERATIVE FOLLOW UP

	GROUP I/ GROUP II	OD/ OS	DAY 1	DAY 7	DAY 30	DAY 90	DAY 180
Pain							
Graft retraction							
Graft necrosis							
Graft dehiscence							
Recurrence							
Visual acuity							

SL NO	Name	Age	Sex	GROUP	Complaints	Preoperative		Post operative						
						UCVA	astigmatism	PAIN	GR	GN	GD	Recurrence	BCVA	astigmatism
1	Palpandi	46	M	II	Visual Disturbance	6/18	present	No	No	No	No	Absent	6/12	absent
2	Rajammal	40	F	II	Ocular Discomfort	6/9	present	Yes	No	No	No	Absent	6/9p	absent
3	Karupayi	44	F	I	Visual Disturbance	6/60p	present	No	No	No	No	Absent	6/60	absent
4	Karupan	57	M	II	Visual Disturbance	4/60p	present	Yes	No	No	No	Present	6/60 p	absent
5	Kattayan	60	M	I	Visual Disturbance	6/9	present	No	No	No	No	Absent	6/9	absent
6	Arjun	41	M	II	Cosmetic	6/12	absent	No	No	No	No	Absent	6/6	absent
7	Sudhamathi	40	F	I	Ocular Discomfort	6/24	present	No	No	No	No	Absent	6/24	absent
8	Ammasi	49	M	I	Ocular Discomfort	6/36	present	No	No	No	No	Absent	6/12	absent
9	Nagarajan	48	M	I	Visual Disturbance	6/36	Present	No	No	No	No	Absent	6/12	absent
10	Lakshmi	45	F	II	Visual Disturbance	6/12	present	No	No	No	No	Absent	6/9	absent
11	fathima beevi	40	F	II	Ocular Discomfort	6/12	present	No	No	No	No	Absent	6/9	absent
12	Guru	38	M	II	Ocular Discomfort	6/24	present	No	No	No	No	Absent	6/9	absent
13	Alagammal	37	F	II	Visual Disturbance	6/12	present	Yes	No	No	No	Absent	6/18	absent
14	Raman	55	M	II	Visual Disturbance	5/60	present	No	No	No	No	Absent	6/24	present
15	Muthurakku	41	F	II	Visual Disturbance	6/36	present	No	No	No	No	Absent	6/12	absent
16	Parthiban	55	M	I	Visual Disturbance	5/60p	Present	No	No	No	No	Absent	6/36	absent
17	Nagaraj	59	M	I	Visual Disturbance	6/24	present	No	No	No	No	Absent	6/36	absent
18	Alagarsamy	49	M	II	Ocular Discomfort	6/24	present	No	Yes	No	No	Absent	6/12p	absent
19	Ochammal	47	F	II	Visual Disturbance	6/18	present	Yes	No	No	No	Absent	6/12	absent
20	Rengasamy	49	M	II	Ocular Discomfort	6/24	present	No	No	No	No	Absent	6/18	absent
21	Pandi	51	M	II	Visual Disturbance	6/36	present	No	No	No	No	Present	6/18p	absent
22	Alagesan	46	M	I	Cosmetic	6/12	present	No	No	No	No	Absent	6/9	absent
23	Pichammal	52	F	I	Ocular Discomfort	6/18	present	No	No	No	No	Absent	6/9	absent
24	Rajavelu	41	M	I	Visual Disturbance	6/60	present	No	No	No	No	Absent	6/60	absent
25	Karuppan	54	M	II	Visual Disturbance	6/24p	present	Yes	No	No	No	Absent	6/12p	absent
26	Packiyam	43	F	I	Ocular Discomfort	6/24	present	No	No	No	No	Absent	6/12	absent
27	Kathavarayan	49	M	I	visual and Ocular Discomfort	6/60	present	No	No	No	No	Absent	6/18	absent
28	Balammal	62	F	I	Ocular Discomfort	6/18	present	No	No	No	No	Absent	6/9	absent
29	Arokiyapandi	58	M	I	Visual Disturbance	6/24p	present	No	No	No	No	Absent	6/9	absent
30	Vijayan	48	M	I	Ocular Discomfort	6/12p	present	Yes	No	No	No	Absent	6/9	absent
31	Muthupillai	45	F	II	Ocular Discomfort	6/12p	present	No	No	No	No	Absent	6/12	absent
32	Palsamy	48	M	I	visual and Ocular Discomfort	6/18	present	No	No	No	No	Absent	6/9p	absent
33	Puglendi	59	M	I	visual and Ocular Discomfort	6/9p	absent	No	No	No	No	Absent	6/6	absent
34	Arumugam	49	M	I	Visual Disturbance	6/24	present	No	No	No	No	Absent	6/12p	absent
35	Mookayee	49	F	II	Ocular Discomfort	6/12	absent	No	No	No	No	Absent	6/6	absent
36	Shanmugam	57	M	II	Visual and Ocular Discomfort	6/60	present	No	Yes	No	No	Present	6/36	absent

37	Munusamy	56	M	II	visual and Ocular Discomfort	6/36	present	No	No	No	No	Present	6/24	absent
38	Oomathevar	58	M	I	Ocular Discomfort	5/60	present	no	No	No	No	Absent	6/60p	absent
39	Durai	56	M	I	Visual and Ocular Discomfort	6/60	present	Yes	Yes	No	No	Absent	6/36	absent
40	Sudalai	44	M	II	Ocular Discomfort	6/9	present	No	No	No	No	Absent	6/9	absent
41	Perumal	57	M	I	Ocular Discomfort	4/60	present	No	No	No	No	Absent	6/60p	absent
42	Kaalaiyan	49	M	I	Visual Disturbance	6/24	present	No	No	No	No	Absent	6/9	absent
43	Rangaraj	41	M	II	Cosmetic	6/12	present	No	No	No	No	Absent	6/6	absent
44	Parvathy	40	F	I	Ocular Discomfort	6/9p	present	No	No	No	No	Absent	6/9	absent
45	Murugan	49	M	I	Ocular Discomfort	6/36	present	No	No	No	No	Absent	6/12	absent
46	Gunasekar	48	M	II	Ocular Discomfort	6/6p	present	No	No	No	No	Absent	6/6	absent
47	Parvatham	51	F	II	Visual Disturbance	6/12	present	No	No	No	No	Absent	6/12	absent
48	Nagammal	40	F	II	Ocular Discomfort	6/18	present	No	No	No	No	Absent	6/12	absent
49	Thangaraj	38	M	I	Ocular Discomfort	6/24	present	No	No	No	No	Absent	6/12	absent
50	Farveen	39	F	I	Visual Disturbance	6/12	present	Yes	No	No	No	Absent	6/9	absent
51	Poovan	55	M	II	Ocular Discomfort	6/24	present	No	No	No	No	Present	6/18	absent
52	Kaliyapan	49	M	II	Visual Disturbance	5/60	present	Yes	No	No	No	Absent	6/36	absent
53	Grace mary	47	F	I	Ocular Discomfort	6/18	present	Yes	No	No	No	Absent	6/6	absent
54	Ramaiah	49	M	II	visual and Ocular Discomfort	6/60p	present	No	No	No	No	Absent	6/24	absent
55	Ooraan	51	M	II	Visual Disturbance	6/36	present	No	No	No	No	Absent	6/18p	absent
56	Kaaliyappan	46	M	I	Visual Disturbance	6/12	present	No	No	No	No	Absent	6/9	absent
57	Naagappan	58	M	II	Ocular Discomfort	6/9	present	Yes	No	No	No	Absent	6/9	absent
58	Sundaram	44	M	I	Ocular Discomfort	6/12p	present	Yes	No	No	No	Absent	6/9	absent
59	Backiyam	45	F	II	Ocular Discomfort	6/60p	present	No	No	No	No	Present	6/60	absent
60	Arulappan	48	M	I	Ocular Discomfort	6/18	present	No	No	No	No	Absent	6/12	absent

KEY TO MASTER CHART:

M - male

F - female

UCVA - uncorrected visual acuity

BCVA - best corrected visual acuity

GR - graft retraction

GN - graft necrosis

GD - graft dehiscence

MADURAI MEDICAL COLLEGE
MADURAI, TAMILNADU, INDIA -625 020
(Affiliated to The Tamilnadu Dr.MGR Medical University,
Chennai, Tamil Nadu)

ETHICS COMMITTEE CERTIFICATE

Name of the Candidate	:	Dr.Valentina Y R
Course	:	PG in MS., Ophthalmology
Period of Study	:	**2015-2018**
College	:	**MADURAI MEDICAL COLLEGE**
Research Topic	:	To compare the outcome of conjunctival autograft after extended excision of pterygium along with and without cyclosporine for primary fleshy pterygium
Ethical Committee as on	:	21.04.2017

The Ethics Committee, Madurai Medical College has decided to inform that your Research proposal is accepted.

Member Secretary Chairman Dean / Convenor

Prof Dr V Nagaraajan
M.D., MNAMS, D.M., Dsc.,(Neuro), Dsc (Hon)
CHAIRMAN
IEC - Madurai Medical College
Madurai

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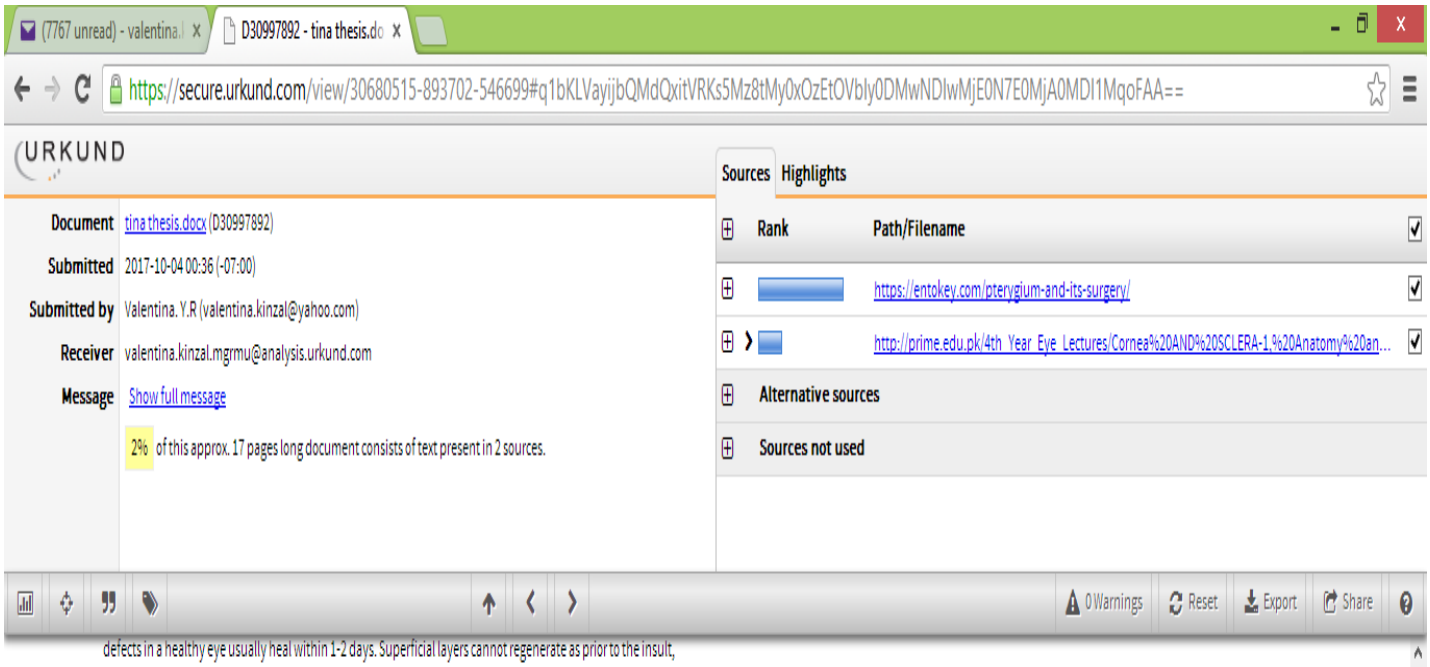
Madurai-20



defects in a healthy eye usually heal within 1-2 days. Superficial layers cannot regenerate as prior to the insult, but deeper layers on healing adhere more to sclera. Hence prior conjunctival surgeries would be a problem in need of a large conjunctival flap. With increasing age conjunctival epithelium gets thickened and keratinized, stroma thins and become less elastic, vessels become more prominent and tortuous. CORNEA: It is an avascular ,transparent tissue, which contributes to the transmission of light and refraction and aids in the visual

38% #1 Active

is 11-12mm and vertical diameter is 10-11mm. The refractive index of cornea is 1.376 LAYERS OF CORNEA 1] Epithelium 2] Bowman's membrane 3] Stroma or substantia propria 4] Descemet's membrane 5] Endothelium. Corneal epithelium

External source: http://prime.edu.pk/4th_Year_Eye_Lectures/Cornea%20AND%20SCLERA-1,%20... **38%**

is 7.8mm and posterior surface is 6.5mm. ‣ Refractive Power of cornea is 43D. ‣ Refractive index is 1.33. Histology It consists of five layers: ‣ Epithelium. ‣ Bowman's membrane. ‣ Stroma. ‣ Descemet's membrane. ‣ Endothelium. Epithelium ‣

and tear film contributes to the smooth ocular surface. The degenerative changes of the cornea occurs initially at the limbus. Cornea plays a main role in development of astigmatism, and hence the refractive surgery. The radial and tangential incisions involving 85-90% the thickness of the cornea helps in flattening the cornea and helps in astigmatic surgery.

TEAR FILM The tears, is a combination of secretions from the lacrimal gland, Meibomian glands, goblet cells and are drained by nasolacrimal passages. They pass through epithelial surface of cornea and conjunctiva and its vasculature. This optically clear layer is essential for nourishing and protecting the ocular surface, and for good vision, lubrication and comfort. It is a tri layered structure ‣ The lipid layer -- 0.1 micron ‣ The aqueous layer - 7 to 10 micron ‣ The mucin layer -- 0.2 to 1 micron THE LIPID LAYER It is the outermost layer of the tear film which is secreted by the Meibomean / Zeiss glands/ glands of Moll. Lipid layer deficiency leads to formation of dry spots on the cornea. THE AQUEOUS LAYER It is the middle layer contributing more than 90% thickness of tear film. The basic secretors of aqueous layer are goblet cells, accessory lacrimal glands of Krause and Wolfring, and the reflex secretor of aqueous layer is main lacrimal gland. Deficiency occurs in chemical burns, Stevens Johnson Syndrome, vitamin A deficiency and ocular pemphigoid. THE MUCIN LAYER It is the innermost layer covering

CERTIFICATE

This is to certify that this dissertation titled "AN OBSERVATIONAL STUDY TO COMPARE THE OUTCOME OF CONJUNCTIVAL AUTOGRAFT AFTER EXTENDED EXCISION OF PTERYGIUM ALONG WITH AND WITHOUT CYCLOSPORINE FOR PRIMARY FLESHY PTERYGIUM"

of the candidate **Dr.Y.R.VALENTINA** with registration number **221513106** for

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